How to make MORE MONEY with POULTRY

The Poultryman's Manual

LAY OR BUST

THE PARK & POLLARD CO.

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How to make MORE MONEY with Poultry

LAY OR BUST FEEDS

A Poultryman's Manual, by

The PARK and POLLARD CO.

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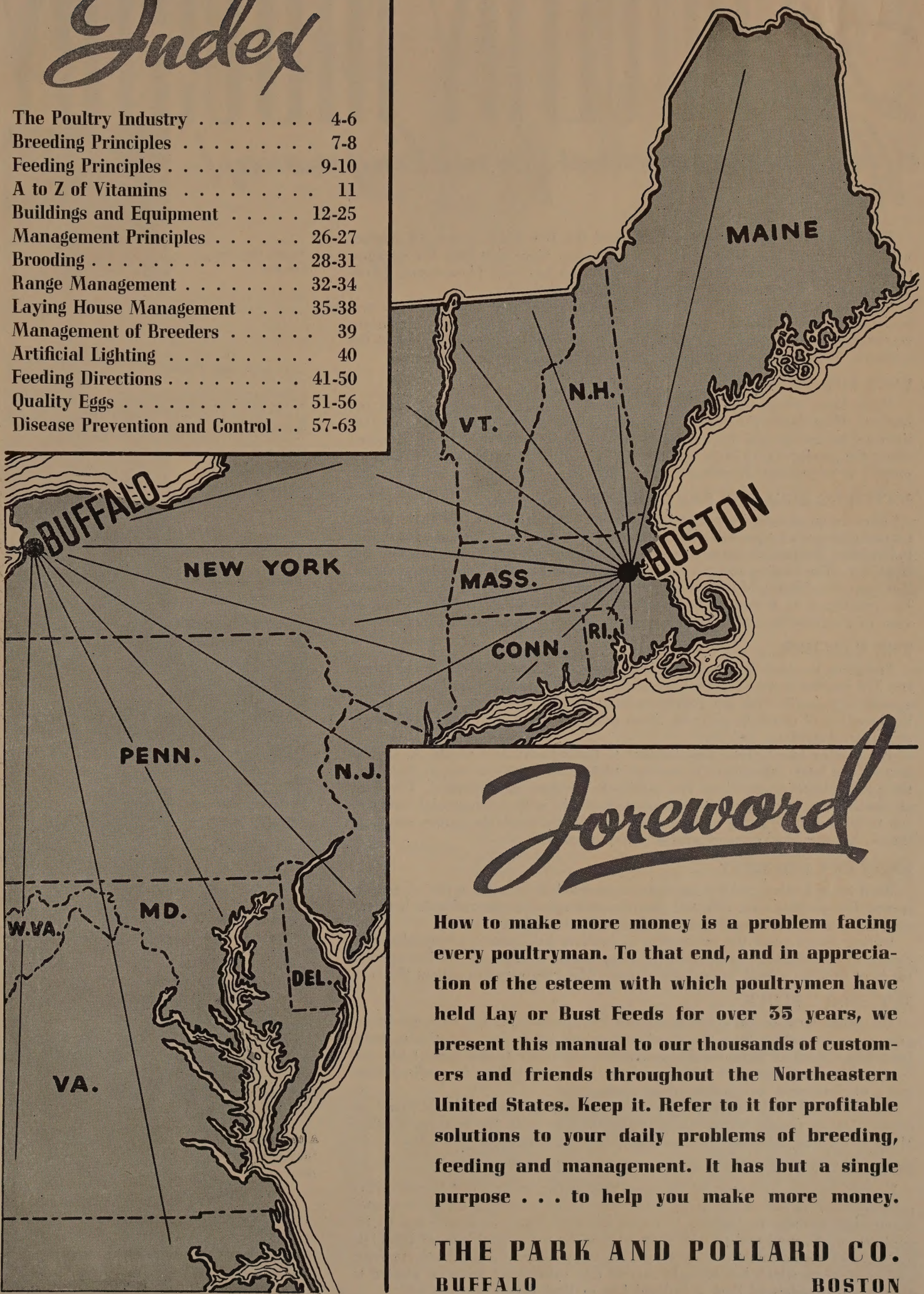


Foreword

How to make more money is a problem facing every poultryman. To that end, and in appreciation of the esteem with which poultrymen have held Lay or Bust Feeds for over 35 years, we present this manual to our thousands of customers and friends throughout the Northeastern United States. Keep it. Refer to it for profitable solutions to your daily problems of breeding, feeding and management. It has but a single purpose . . . to help you make more money.

THE PARK AND POLLARD CO.

BUFFALO **BOSTON**

The POULTRY INDUSTRY

offers many avenues for making money!

The Park & Pollard Company introduced the Dry Mash system of feeding with Lay or Bust Dry Mash thirty-two years ago. Since that time the development of the poultry industry in the United States has been phenomenal, particularly in the Eastern States served by this organization.

Prior to that time practically all of the hens were kept in small farm and backyard flocks. Although these small flocks still make a decidedly important contribution of eggs and meat there has been a great commercialization of the industry. Poultry plants with thousands of laying hens are now common.

EGGS FOR MARKET

Many large plants are devoted exclusively to the production of eggs for market. These farms purchase hatching eggs, baby chicks or started pullets for their replacements and the rooster is taboo. Their problems are all centered about the production of large numbers of eggs of high market quality. Poultry meat is a by-product. Breeding is a problem only when buying replacements.

HATCHING EGGS AND BABY CHICKS

Other large plants are primarily breeding establishments. In these plants market eggs are a by-product. The effort here is to develop a flock of outstanding individuals, having an ancestry of high production, fertility, hatchability and livability. The feeding program is built around these factors to a large extent. The eggs are either sold to commercial hatchers, or are hatched by the breeder. His reputation as a breeder is based on the quality of his chicks. From the view of progress the breeder is the most important member of the industry.

THE HATCHER

The chick hatchery is one of the most outstanding developments of the industry. The hatcher may or may not operate a poultry farm. Frequently he operates a relatively small farm but purchases most of his eggs from outlying flocks, the breeding of which he controls. Some purchase all of their eggs. Still others do custom hatching.

The hatcher has a great responsibility to the industry as a whole. As will be pointed out later, inheritance is an important factor in the success or failure of the poultry enterprise. Vigor and ability to produce are inherited. The baby chicks are the future profit—or loss—makers. It is the commercial hatcher's job to sell potential profit makers. Good chicks are worth the money asked for them. Inferior chicks are expensive at any price.

BROILERS AND MEAT

Broilers and other poultry meat are a by-product of most types of poultry farms. The surplus cockerels and the non-productive or unprofitable hens are sold either alive or dressed and contribute additional income.

During recent years the production of broilers has become a specialized industry of considerable proportions. Broiler plants capable of producing thousands of broilers a week are not uncommon. Many operate throughout the year.

THE SMALL FLOCK

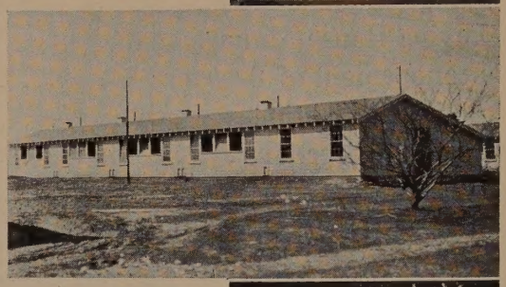
The small farm or backyard flocks are less spectacular, but collectively are even more important than the so-called commercial flocks. Practically every farm has a flock of hens which contributes materially to the farm table and frequently is an important source of farm income. Poultry, in medium sized units, fits into most any system of farming.

The backyard flock furnishes recreation, interesting work and additional income to many people whose work during the day is in the factory or office. Many of the most successful commercial poultry plants began this way.

POULTRY HUSBANDRY A BIG PROFIT ENTERPRISE

Poultry husbandry is one of the most interesting and profitable enterprises related to agriculture. Each of its many specialized phases offers an unlimited opportunity to make real money. Success, however, can only be attained by the application of sound and proved principles to the many problems of breeding, feeding and management. These principles are outlined in this book, together with a program which has brought success and substantial financial reward to thousands of feeders of Park & Pollard Lay or Bust Feeds.

Profits for the hatcher



A large commercial plant

Dressed broiler, fowl and capon

Home egg delivery pays real money

Chick rearing brings real rewards

A typical and profitable backyard flock

The feed that poultry thrives on

Grow into the POULTRY BUSINESS

The future of the poultry business is bright indeed and there will always be an opportunity to make money for those who apply themselves intelligently. The hen is one of the most economical producers of food. Her place is assured as an important factor in eastern agriculture.

GREAT OAKS FROM LITTLE ACORNS

We are often asked how best to start with the poultry business. Our answer invariably is, "Start small. Let the business grow as you grow in experience."

Poultry keeping is among the most profitable of farm enterprises but, as in everything else, there are no short cuts to success. From observation of many dismal failures there is nothing we can recommend more strongly to the beginner than a modest beginning. Growth and success will come inevitably with experience and knowledge of the game.

THE FARM FLOCK OFFERS SPLENDID PROFIT POSSIBILITIES

There is a big opportunity for increased income on many general farms through enlargement of the farm flock and the application of a more efficient method of management and feeding. On many farms the hens are allowed to shift for themselves through the summer and are fed table scraps with perhaps some grain through the winter. These birds lay in the spring and summer but go on vacation in the winter. On many of these farms the flocks could be considerably increased in size without a corresponding increase in labor. A constant supply of eggs and meat for the farm table could be had the year round and the surplus would add materially to the farm income. Frequently there are buildings on the farm which can easily be converted into satisfactory laying quarters. With modern feeds and feeding methods such a move often results in a development of the poultry enterprise to the point where it becomes the major source of income.

WHAT THE BEGINNER WANTS TO KNOW

The questions which arise first in the mind of the beginner have to do with:

1. LOCATION AND SIZE

The location of the farm should be considered in relation to markets, type of enterprise and proximity to others in the same type of business. There are important secondary markets in every section of the Eastern States, many of which absorb all or a large part of the eggs and poultry products produced locally. The breeders and the hatchers who have outstanding stock to sell can find a market for it regardless of the location of their plants. The broiler producer has an advantage if he is close to his consuming market. Regardless of type of enterprise, it is well for the beginner to locate in a poultry section where he will have the advantage of the experience of his neighbors and an already organized marketing machinery.

Size of farm depends upon the type of enterprise. If one is to raise his own pullets on range, enough land should be available so that the range will never be overcrowded and thus permit reasonable range rotation. Where the pullets are raised in confinement, relatively few acres are required for the operation of a large plant. All that is required are proper buildings.

2. CAPITAL AND PROFIT

No definite figures can be given as to either capital or profit. The capital required depends on the cost of the farm and how it is financed; the type of enterprise; whether you start with baby chicks or started pullets, and their number and quality; the feed market; buildings available or required to construct; availability of family labor and many other factors.

Profits are the result of the intelligent application of the known facts to the job at hand. They cannot be predetermined. They depend upon the efficiency of the individual in his use of those breeding, feeding and management principles which have proved to be sound and which, properly applied, are known to result in success.

3. THE CHOICE OF BREED

In choosing a breed consider the following factors:

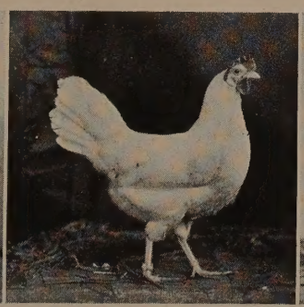
1. Are you going in for commercial egg production, or meat, or do you want a general utility breed?
2. What is the local market demand as to color of eggs, meat, etc.?

There is no one best breed. Each has outstanding characteristics which adapt it to particular conditions and, it is probably true that within reasonable limits, one breed is as profitable as another. For eggs, market demand should be considered. The New York market still prefers a white shelled egg as produced by the Leghorn, Ancona and Minorca, while Boston markets prefer brown shells as produced by the Rock, Red and Wyandotte. These prejudices are rapidly disappearing, however. For commercial egg production the choice will probably be from among the above, and for general purposes from among the American breeds, of which the last three are typical. For meat, the American housewife prefers a yellow skinned bird.

CONSULT YOUR PARK & POLLARD SERVICEMAN

Whether you contemplate the enlargement of a farm flock or an initial entrance into the poultry business, the experience of the Park & Pollard Service Department can be of invaluable assistance to you. Feel free to call upon us at any or all times. This service is rendered entirely without obligation.

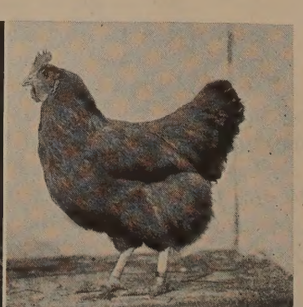
BARRED ROCK



LEGHORN

RHODE ISLAND RED

WYANDOTTE



NEW HAMPSHIRE RED

The BIG THREE in the POULTRY BUSINESS

The major problems in poultry husbandry can be grouped under three heads: Breeding, Feeding and Management.

A chain is as strong as its weakest link. The poultry enterprise can be compared to the three linked chain. The man, the feed and the stock; each link of equal importance as far as the net profit result is concerned.

Breeding

By breeding is meant the inheritance of the stock as to vitality, livability and production. The ability to live and to produce is born with the chick. This fact is of the utmost importance and has a direct bearing on the profit possibilities of any flock. If the tremendous advantages of good breeding were generally understood, the market for inferior, nondescript chicks would disappear over night. Breeding or inheritance determines the profit possibilities of the bird. The best of feeds and management cannot make amends for faulty breeding.

That is why the breeder of good chicks is so important to the progress of the industry. Lay the foundation for your own success with chicks of known livability and production characteristics. Pay the price for *good* chicks. It is the best investment you can make.

It costs a little more at the beginning to start right but, in the end, it costs far more to start wrong.

GOOD STANDARD BRED STOCK

(a) Produces more eggs because bred for egg production for generations.
(b) Produces eggs of greater uniformity as to size, shape and color.
(c) Utilizes feed more efficiently.
(d) Makes far more money for the poultryman.

When buying chicks look for an ancestry of high production and high vitality. In fact, livability and vitality must be given equal consideration with production in selecting the chicks and culling them thereafter.

Feeds and Feeding

Feeds are the raw materials that should develop the inherited health and production characteristics of poultry to their maximum money making ability.

Your interest in a feed is the profit *you* can make from it. If you buy good chicks it is because you hope they will return a greater profit than if you had purchased cheaper individuals.

If you buy good, proved feeds you do so with the same thought. From a profit point of view, the choice of feeds is as important as the selection of stock.

In the last analysis profits should be the deciding factor. If sawdust at $5.00 a ton would return a greater net profit at the end of the year than a balanced ration at $50.00 a ton, it would be a waste of money to feed the balanced ration. If cheap chicks would make more money for you in the end than good ones, there would be no reason for buying quality stock.

Feed is the raw material that produces eggs, meat and breeding stock. Scientifically balanced rations return a profit two ways:

(1) Immediate production profits.
(2) The profits that come from improved health, increased breeding efficiency and complete development of the young stock.

From any angle it *pays* to feed scientifically balanced rations. To keep abreast of the times in the study and application of the newer knowledge of nutrition is beyond the realm of the individual poultryman. It requires a large and efficiently manned organization. Because of its extensive facilities, its staff of trained men and its first hand knowledge of the practical needs of the feeder, the Park & Pollard Co. has maintained for 35 years a position of leadership in the production of complete and scientifically blended and balanced rations that have definitely proved their ability to help feeders make more money.

Management

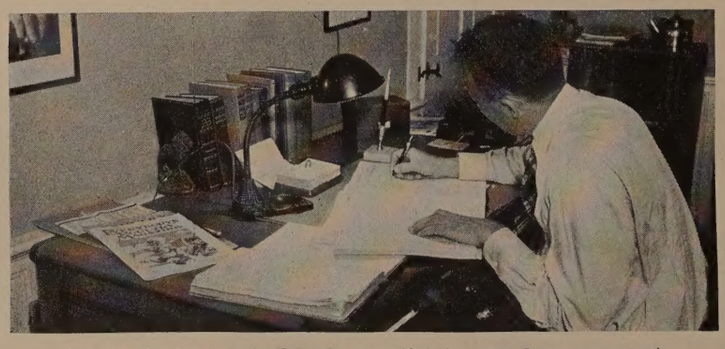
No business can be stronger than the man who runs it. The poultry business is one of many details, and success depends upon the degree of attention given to them. The success formula in poultry keeping is as follows:

Good, productive stock

Good feeds and a sound feeding method

Efficient management

The following pages are devoted to an explanation of proved breeding, feeding and management programs.

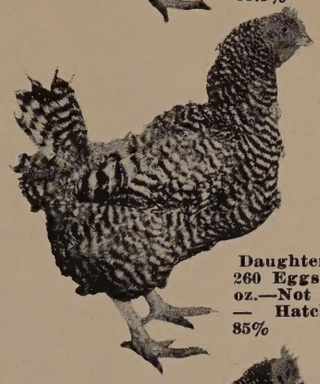


Accurately kept records are essential to sound management

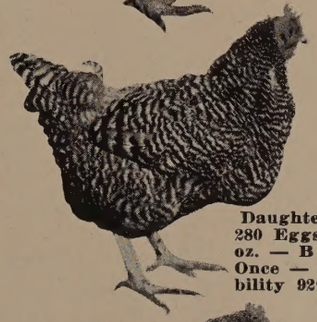
HOW TO BREED for GREATEST PROFITS

Daughter No. 1 258 Eggs — 26.3 oz.—Not Broody — Hatchability 90.5%

Daughter No. 2 272 Eggs — 25.9 oz.—Not Broody — Hatchability 88.5%



Daughter No. 3 260 Eggs — 26.3 oz.—Not Broody — Hatchability 85%



Daughter No. 4 280 Eggs — 25.8 oz. — Broody Once — Hatchability 92%

Daughter No. 5 272 Eggs — 26 oz.—Not Broody — Hatchability 89%

CULL FROM DAY CHICKS ARE HATCHED

The process of culling and selection must be practiced from the time the chicks are hatched through the entire life cycle of the bird.

Immediately upon removing the chicks from the incubator, destroy every cripple, every weakling, every malformed chick, and every runt.

See that every chick is well fluffed out, is strong enough to stand squarely on its feet and run about.

If you purchase your baby chicks, examine them upon removal from the shipping box. Be sure that every chick you place in your brooder house or in your chick batteries is a strong, rugged specimen, normal in every respect.

From this time until the pullets are placed in the laying houses, cull on a basis of health and constitutional vigor. Remove all sick birds as soon as noticed. Remove those that are unusually slow in development; any that contract vicious habits and those that develop abnormalities.

REMEMBER LIKE PRODUCES LIKE

There is a simple law in animal breeding which every poultryman should consider in the selection of his laying and breeding stock. "Like begets like".

This law applies only in a general sense, however, as far as immediate results are concerned. Inheritance is complicated in the extreme and it is not always possible to pick the high producers by appearance alone. For this reason the breeder should trap-nest his birds or keep such accurate records that, by consistently mating the best to the best, he develops families in which the characteristics of high production, early maturity, rapid feathering, large egg size and other desirable factors are fixed.

The most potent weapon in the hands of the breeder is selection on the basis of trap-nest records combined with progeny testing, and on the visible health condition of the individual birds. The important factors to keep in mind in selecting and culling the breeding and laying flock are:

1. Constitutional vigor and high vitality
2. High egg production
3. Egg size up to standard
4. Standard size and weight for the breed
5. Uniformity
6. Color

GIVE INHERITANCE A CHANCE

Culling is an essential and most important part of the management and breeding program. Before general culling for poor growth, low vitality, lack of uniformity, poor feathering, low production, low fertility and hatchability and other general factors, be sure that the deficiency is not due to improper feeding and management rather than to inheritance. To capitalize fully on a sound breeding program the flock must be given every opportunity to develop its inherited characteristics to their maximum. This is only possible when the feeding and management programs are sound. For instance, parasitic infection is often mistaken for lack of constitutional vigor. Improper brooding will sap the vitality of chicks which are inherently vigorous when hatched. Poor feathering, poor pigmentation, slow growth, poor production; these factors and many others are too often the result of improper feeding rather than improper breeding.

Culling will result in increased profits only in those flocks where the breeding, feeding and management program are equally sound and right.

(Continued on next page)

HOW TO BREED FOR GREATEST PROFITS

THE SELECTION OF BREEDING PULLETS

1. Breeding pullets should be hatched from old hens.
2. Select for size, vigor and early maturity.
3. Check on egg production, egg size and leg band the heavy layers.
4. Select for breeders those that have laid heavily over a reasonably long period.

THE SELECTION OF BREEDING HENS

1. Begin selecting old hens for breeders in the pullet year.
2. Select for body and egg size, persistency of production, high production.
3. Use those that come through the molt in healthy vigorous condition.
4. Whenever practical, use hens rather than pullets for breeders.

THE SELECTION OF BREEDING COCKERELS

1. Select breeding cockerels preferably from the early hatches.
2. Make first selection at 10 to 12 weeks.
3. Choose only cockerels of high vitality, rapid growth and good feathering.
4. Consider carefully good color, correct breed type and uniformity of the cockerels.

PROGENY TESTING

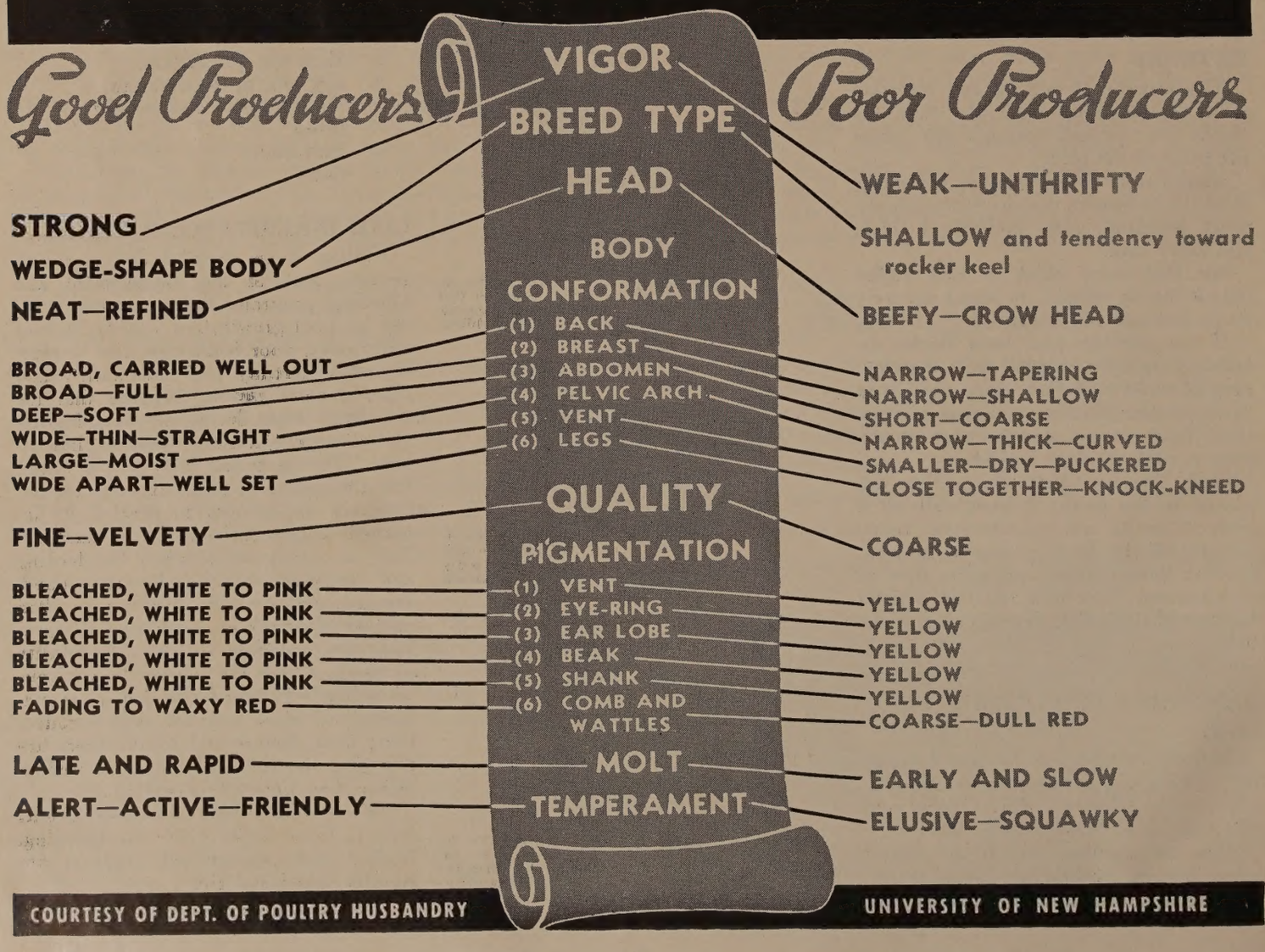
In future years the use of the production records of brothers and sisters as well as of daughters (progeny testing) of proposed breeding hens and poultry sires will be more widely used. Hence, every available record concerning brothers, sisters, or daughters, should be used now in breeder selection.

The value of a poultry breeding sire depends upon his pedigree, his individuality, and the quality of his progeny. Carefully chosen males and hens should be used through an extended breeding season, and as long as they are productive of strong fertile eggs. Hatching eggs may well be saved from January 1st through approximately April 15th. It should be possible to figure safely on producing during the season at least 10 pullets from each breeding hen.

CULLING THE LAYING FLOCK

The following chart can be used as a guide in culling the laying flock. It must be kept in mind, however, that no accurate way of selecting for high production by physical examination has yet been found. For real accuracy the trap-nest must be used, and a record kept of production and egg size. This chart simply outlines the characteristics of a good laying hen.

A COMPARISON OF CHARACTERISTICS OF GOOD AND POOR PRODUCERS



How to FEED for Greatest Profits

The average hen in the United States produces not more than 80 eggs per year. Most of these eggs are produced in the spring and early summer months when egg prices are usually at their lowest level.

Yet individual hens have laid as high as 361 eggs and flock records of 250 or more eggs are not uncommon.

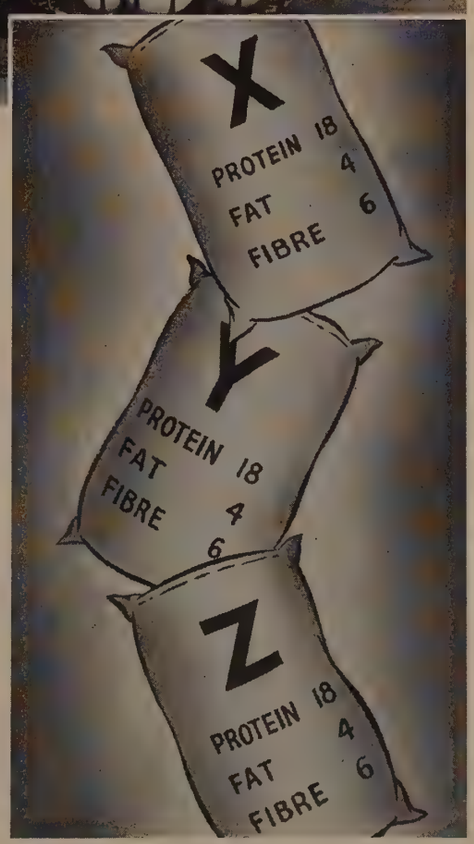
The hen which produces 80 eggs per year is not profitable. In fact, in commercial flocks, profits are usually not made until an average of 120 eggs per bird is recorded.

Every flock, regardless of size, should be operated at a profit. With good management, the two major factors in determining profits are breeding and feeding.

Many birds are unprofitable because they have not the inherited ability to produce. *More are unprofitable because improperly fed.* For maximum growth, health, production and reproduction, the birds must be supplied with carefully balanced feeds containing the necessary proteins, carbohydrates, fats, vitamins and minerals to meet every need. Feed is the raw material for muscle, tissue, bone building and egg production. The number of eggs a well cared for hen will produce up to the limit of her inherited ability depends entirely on her feed.

FEED FOR PRODUCTION AND HEALTH

In feeding it is important that you do not sacrifice the health of flock in your desire for high production. Profits are dependent not so much on *immediate* high production figures as on *continued* high production. Continued high production is possible only in flocks having a high degree of vitality, vigor and rugged health.



As production is increased an unnatural strain is placed on the birds. Under present day methods it is necessary to start the chicks and rear them in relatively large sized flocks. We expect and get much faster growth and earlier maturity than was the case twenty years ago. High production is demanded. This speeding up of the industry requires feeds to meet the new conditions. It becomes necessary to supply in the feed *everything* required for fast but complete growth, for bodily vigor, for high production and for maximum breeding efficiency. Moreover, the feed must do its part in building resistance to disease and in keeping chick, pullet and laying hen mortality at a minimum.

Health is a factor of first importance. In Breeding, Management and Feeding make the *Health* of the flock the foundation of your program:

What is a COMPLETELY BALANCED Ration?

The Park & Pollard definition of a completely balanced ration and feeding program is one that begins with the breeders; produces vigorous chicks with high livability; grows them to strong, vigorous maturity and carries them through their productive life at the highest possible efficiency.

The job of the feed is to produce profits for the feeder!

(Continued on next page)

HOW TO FEED FOR GREATEST PROFITS

Science and Practice Go Hand in Hand

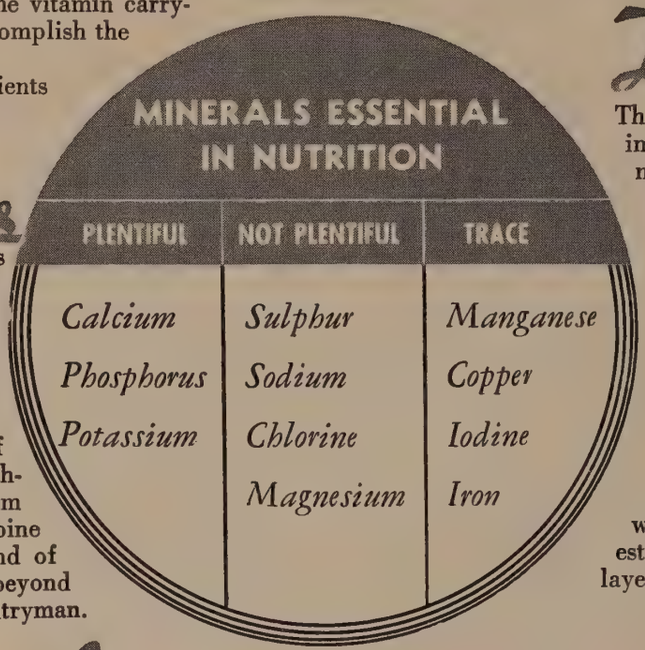
The problems in producing a balanced feed are many and intricate. The really balanced ration is the result of a vast amount of research in laboratories, on experimental farms, on practical poultry farms, and of the findings of research workers on poultry nutrition problems throughout the world.

The manufacture of a balanced feed is not simply mixing together ingredients to get the correct protein, fat and fiber content found on the feed tag. The following are a few of the more important elements which require constant attention and research, and which no poultryman who gives adequate attention to the details of management, is in a position to solve:

1. The source and composition of the ingredients.
2. Their nutrient value alone and when combined with other ingredients.
3. The source and quality of the proteins.
4. The source and quality of the minerals.
5. The amounts or proportions of these nutrients and minerals necessary for best results.
6. The quantity and quality of the vitamin carrying materials necessary to accomplish the desired results.
7. The relation of all the nutrients to each other.

The Proteins

The Park & Pollard Co. has at its command knowledge of all the available sources of all the nutrients. We have long known that the quality of the proteins is of even greater importance than the amount. We know that it is necessary to combine certain proteins of the proper quality with certain others of similar quality for maximum results. To know which to combine with which, in what quantity, and of what quality requires facilities beyond the reach of any individual poultryman.



The Minerals

What we have said concerning proteins is equally true of the sources, kind, quality, amount and proportions of minerals, but here the problem is even more complicated. The Park & Pollard Co. has made many important contributions to the solution of the mineral problem. In fact, the superiority of its feeds can be attributed largely to its early recognition of the relation of minerals and vitamins to complete nutrition. Many minerals are needed in but minute quantities. Some of these are either entirely lacking in the usual ingredients or, if present, may be in a form which the birds cannot assimilate. The problem is to determine the exact mineral needs of the birds, both as to kinds and quality, and to incorporate in the ration ingredients that will produce the desired result.

We have been working along these lines for many years with unquestioned progress which is reflected in the results obtained by poultrymen using Park & Pollard feeds. For instance, perosis, or slipped tendons is due to a lack of mineral balance in most cases. We early discovered that slipped tendons of nutritional origin could be avoided by the use of the proper kinds and amount of calcium and phosphorous, together with the proper use of certain grains. Park & Pollard Feeds are proof against perosis of this type and have been for many years. This is but one of the many plus factors contained in Park & Pollard Feeds which mean greater profits to the poultryman. And, let it be said right here that greater profits to the poultryman have always been and will continue to be our aim.

The Vitamins

The subject of vitamins is as broad and important as that of minerals and cannot be discussed in detail here. These important nutritional factors are absolutely essential to many of the life processes. The practical sources of some of them are few and it is our job to find those which will complete the ration most thoroughly and adequately. The table on page 11 gives a general idea of the important relationship existing between vitamins and your profits. Park & Pollard Feeds are adequately fortified with every vitamin required for highest efficiency by baby chicks, pullets, layers and breeders.

THE MEASURE OF FEED VALUE

The only sound measure of feed value is results. Park & Pollard Feeds are scientifically complete and are built for feeder profits. They contain everything needed for rapid but complete development of the chicks and growing birds, and for maintaining the laying flock at a high level of profitable production. It is by the measure of results and feeder profits that Park & Pollard Feeds are used exclusively on thousands of successful poultry plants throughout the east.

The A to Z of VITAMINS

VITAMIN	FUNCTION	DEFICIENCY RESULTS IN	ABSENCE RESULTS IN	SOURCE IN PARK & POLLARD FEEDS
A Anti-Opthalmic	(a) Promotes growth and health. (b) Promotes appetite and digestion. (c) Promotes tissue formation. (d) Acts as a regulating substance. (e) Prevents infections, notably of eyes, sinuses, air passages and lungs. (f) Increases resistance to many infectious diseases and parasites. (g) Concerned with reproduction.	(a) Lowered resistance to disease. (b) Loss of appetite. (c) Retarding of growth and development. (d) Dullness of special senses, such as loss of sight, smell and taste. (e) Physical weakness. (f) Susceptibility to diseases of the eyes, ears and kidneys. (g) Diseases involving the air passages, lungs, skin and bladder. (h) Secondary anemia. (i) Influencing reproduction by failure of ovulation. (j) Atrophy of pituitary glands. (k) Infections of alimentary tract.	(a) Xeropthalmia (commonly known as "Nutritional Roup" in fowls). (b) Cessation of growth. (c) Failure of appetite and digestion. (d) Formation of pus in ears, sinuses and glands at base of tongue. (e) Abscesses at base of tongue. (f) Pustules on lining of throat. (g) Blindness and ruptured eyeballs. (h) Prevents conception by failure of ovulation. (i) Kidneys pale, enlarged and filled with urates.	Dehydrated Alfalfa. Cod Liver Oil. Yellow Corn. Manamar. Corn Gluten Meal and Feed. Dried Skim Milk and Buttermilk. Fish Meal. Barley.
B Anti-Neurotic	(a) Increases appetite. (b) Promotes digestion. (c) Protects body from nerve disease. (d) Promotes growth by stimulating metabolic processes. (e) Aids in resistance to parasites. (f) Probably concerned with hatchability.	(a) Loss of vigor. (b) Loss of weight. (c) Impairment of appetite and digestion. (d) Constipation. (e) Subnormal temperature. (f) Enlargement of adrenals. (g) Increase in size and weight of the thymus, pancreas, testes, spleen, heart, liver, kidneys, stomach, thyroid and brain. (h) Various manifestations, referable to the nervous system, such as polyneuritis.	(a) Beri-beri. (b) Peripheral and other forms of neuritis. (c) Atrophy of the lymphoid tissue throughout the body. (d) Edema and paresthesia. (e) Starvation. (f) Death.	Ground Wheat. Wheat Bran. Wheat Middlings. Yellow Corn. Barley. Oats. Dehydrated Alfalfa.
C Anti-Scorbutic	(a) Specific for scurvy. (b) Aids in keeping up body resistance to various infectious diseases. (c) Benefits skin and plumage. (d) Believed an aid in preventing anemia.	(a) Nervousness. (b) Poor growth. (c) Impaired appetite. (d) Lameness (usually from two to three weeks of age in chicks).	(a) Shortening of life. (b) Bleeding from pin feathers. (c) Hemorrhages, such as blood clots beneath the skin, and in muscles of the thigh, around the hock joints, and at the base of the wings. (d) Bones are very brittle.	Dried Skim Milk and Buttermilk and Whey. Birds synthetize this vitamin from other materials.
D Anti-Rachitic	(a) Controls calcium equilibrium. (b) Regulates mineral metabolism. (c) Specific against rickets. (d) Aids in muscle and tissue building. (e) Promotes growth. (f) Promotes health. (g) Increases vitality. (h) Increases egg production. (i) Probably concerned with hatchability. (j) Helps shell formation.	(a) Lowered resistance to infection. (b) Muscular weakness. (c) Instability of the nervous system.	(a) Rickets. (b) Deformity of bones. (c) Death.	Cod Liver Oil. Fish Meal. Manamar.
E Anti-Sterility	(a) The main fertility factor. (b) Exercises a determining role in reproduction (by failure in placental functions). (c) Probably concerned in the metabolism of iron. (d) Increases hatchability, especially when certain other requirements are met.	(a) Poor fertility. (b) Poor hatchability.	(a) Sterility.	Wheat. Wheat Bran. Dehydrated Alfalfa. Manamar. Corn. Oats. Linseed Oil Meal. Barley. Dried Buttermilk, Skim Milk and Whey.
G Anti-Pellagrous	(a) Pellagra-preventive. (b) Essential for growth. (c) Aids in digestive processes. (d) Essential for body maintenance. (e) Probably necessary for good hatchability. (f) Helps to prevent one type of leg weakness.	(a) Loss of weight. (b) Loss of vitality. (c) Sores around the mouth and nose, and on the skin. (d) Nervous symptoms. VITAMIN H—Latest addition to the Vitamin family. Vitamin H has been separated from Vitamin G concentrates by Dr. Lela E. Booker of Columbia University. A diet deficient in Vitamin H, when fed to rats, resulted in a growth of only one-sixth normal size and finally death. The significance of Vitamin H in poultry feeding is yet to be determined at this writing (Sept. 1936). Its presence in P & P Feeds is probably accounted for the same as Vitamin G.	(a) Death. (b) Loss of hair and feathers. (c) Paralysis of legs, characterized by toes turning inward.	Dried Buttermilk, Skim Milk and Whey. Dehydrated Alfalfa. Manamar. Soy Bean Oil Meal. Fish Meal. Barley. Buckwheat. Corn. Oats. Meat Scrap. Wheat. Wheat Bran.

BUILDINGS and EQUIPMENT

Brooder Houses

The many types of brooder houses now being used can be grouped into three main classifications — the colony system, the permanent colony system and the barracks system.

The type of poultry business in relation to the size of farm, kind of land, amount of labor and climate will determine to a large degree the kind of brooding system to use.

There is no one best system under all conditions and so the poultryman must judge for himself which will best meet his conditions.

In choosing a type of brooder house certain fundamental principles should govern the selection of design.

The point to keep in mind at all times in constructing houses for poultry is to create the most healthful conditions. Improperly designed houses are a permanent handicap and are not easily corrected without a large outlay of capital. The following rules are offered as a suggestion for brooder house construction.

1. Brooder houses should be large enough to accommodate a good size brooder stove (62 inch hover) and still give sufficient floor space for feed hoppers and water fountains on wire platforms, plus plenty of room to allow chicks to get away from the heat of the stove.

A cool area surrounding the stove is highly essential to chick health, growth and the prevention of such vices as tail-picking and cannibalism.

Birds forced to live close to the continual, even heat necessary during the first four weeks do not grow well, and their vitality is often badly sapped. Brooder houses smaller than 10′ x 12′ are not recommended. Houses at least 12′ x 14′ are more desirable for broods of 250 to 300 chicks and even then half of the chicks should be *removed at six weeks.*

Chicks grow rapidly, soon become crowded, and no other one factor does more damage to young stock than overcrowding. It produces uneven growth, which is often blamed on either the stock or the feed. Feed can seldom be the cause of uneven growth. If the feed is poor, *all* the chicks will be poor.

Furthermore, overcrowding overloads the litter with wet droppings which leads to the growth and spread of coccidiosis. Only the keenest poultrymen operating under ideal conditions can get away with overcrowding.

2. Brooder house roofs must be tight and should have a saddle that allows the brooder pipe to pass through the roof without causing leaks.

In the long run, the shed roof type of brooder house is the best in both construction and interior living conditions for the chicks. It lends itself readily to the most efficient system of ventilation.

One of the most important factors in brooder house design is its ventilation. Without sufficient discharge of moist warm air, the chicks do poorly and coccidiosis is almost impossible to control.

3. Ceiling insulation is necessary. It saves approximately 35% of your fuel and reduces the cooling area at a point where the air carries the most moisture. The warmest air carrying the most moisture is found at the highest part of the room. There should be a ventilator opening near the highest part of the ceiling to eliminate excess moisture.

4. The best designed colony houses furnish plenty of window space on at least three sides. This results in better chick distribution throughout the house in the day time. At night they bed down more evenly around the hover.

This window arrangement also allows free air circulation during hot weather and furnishes better conditions for the late-hatched chicks during the summer season.

5. Floors should be tight and warm. If wood floors are used there should be two layers of boards with heavy paper between. In the winter it is well to bank the sides of the house

so that cold winds cannot blow under the floors. This is very important not only to chick comfort but to maintain dry litter. Damp litter is one of the worst menaces in rearing chicks. It creates ideal conditions for the growth and spread of coccidia.

Colony Houses.

Colony houses should be at least 10′ x 12′, light in weight so as to be easily moved, with tight, rugged floors and sturdy skids. Colony houses in which chicks are brooded are usually set out on the range the chicks are to use during the growing season. This allows them to run out of doors as soon as the weather permits.

If the houses are not too closely grouped they may be used on the same location for many years. The houses should be far enough apart so that the sod is never killed except for a few feet in front. A range properly handled in this manner will improve from year to year. The only part that needs care is the ground that gets bare around the house. This can be spaded each year after a heavy coat of lime is added.

The only danger in this system is soil contamination with worm eggs. If worms appear in the pullets it is necessary to change to a new range, abandoning the old range for a three year period. The colony system entails the most labor but when properly handled it results in vigorous, healthy stock, well-worth the extra effort.

Permanent Colony Houses

When early chicks are brooded it is of no advantage to have the colony houses spread out over the range as the chicks can not get out of doors until they are 12 to 14 weeks old.

Colony houses grouped together at a handy distance from the dwelling house but away from the hen houses are more economical and satisfactory. If possible, locate the colony houses to the west of the hen houses, to eliminate prevailing winds from blowing contaminated dust from the hen house to the baby chicks.

It is becoming more and more important to isolate the young stock from the old, due to the increase in diseases such as infectious, laryngotracheitis, bronchitis, choryza and rhinitis.

Under the permanent colony system, it is more convenient to leave the colony houses in the same location year after year and use summer shelters for the young stock out on range.

The importance of getting birds out in the direct sunshine and cool air is well recognized by experienced poultrymen. Under this system it can be accomplished in several ways without running into contaminated yard conditions.

Either wire platforms, gravel yards or scratching sheds can be used. For all around conditions, especially during the winter and early spring months, scratching sheds are most desirable.

These can be made by placing two colony houses 20 feet apart, both facing south, and building a wood floor, back and roof between the two. This gives two well-protected pens, each ten feet wide and allows the chicks to go out into the cool air at any time of the year or during stormy, wet weather, keeping them dry, clean and comfortable at all times. Under this system the best early birds are raised. It gives the vitality of the out-of-doors plus the added room necessary during early brooding in confinement.

The scratching shed floor should be covered with gravel or coarse sand and cleaned only when too much manure accumulates.

The maintenance of gravel yards is rather a laborious task. During late March, April and May they must be cleaned frequently. With cold weather there is little danger of coccidia growing, but when warm days and frequent rains come, gravel yards are ideal places for the development of coccidiosis and constitute a serious source of infection.

Wire platforms came into popularity years ago when sanitation was the keynote in controlling coccidiosis. Due to the lack of success at that time in controlling the disease, wire platforms were condemned and in most cases abandoned. The fault was not with the wire platforms, except in cases where too large timbers were used with small mesh wire, but in the condition inside the colony house.

Today wire platforms, if properly constructed, are a satisfactory means of getting the birds out of doors. Coccidia very seldom develops if dry, deep litter is maintained at all times in the colony houses, and both feed and water fountains kept on wire stands.

Wire platforms should be made of ¾-inch hardware cloth on frames of 1 x 5-inch spruce boards set on edge and spaced not over two feet apart. These platforms need not be wider than the colony house and not over 5 to 6 feet deep. Putting bags around the sides to protect the chicks from the cold winds adds to their comfort and increases the use of the platforms. Care should be given that manure does not accumulate on top of the floor braces. Braces can be cleaned right after a rain with a stiff scrub brush on a long handle.

The Barracks System

The barrack system with central heating and continuous brooding systems has rapidly come into popularity, taking the place of the long permanent brooder houses.

Barrack house popularity is due to the fact that it makes an ideal brooder house for all ages of birds, and affords a place for summer and fall layers and broiler raising. The house is used the year round, consequently reducing overhead and increasing the hen capacity of the farm at a season when egg prices are highest. It also affords a place to house laying hens which, under the old system, had to be sold in the fall to make room for the new pullets.

BUILDINGS AND EQUIPMENT—BROODER HOUSES

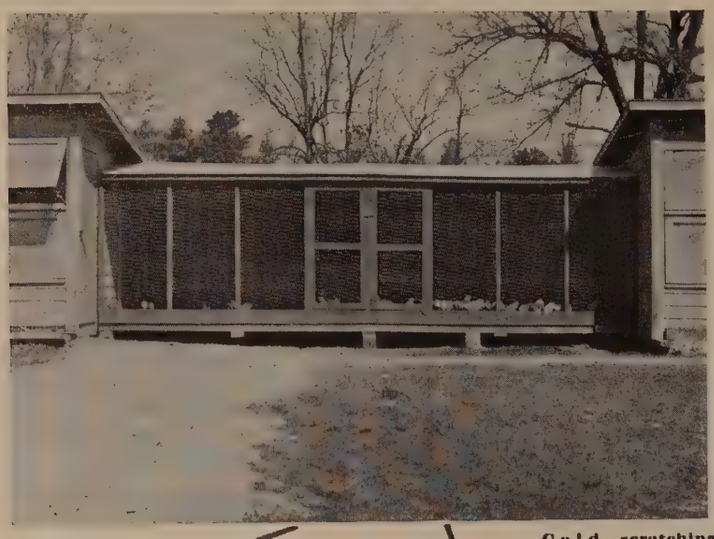
The most popular type of barrack house has been designed by Prof. Roy E. Jones of Connecticut State College and consists of pens 24′ x 24′ either in single or double deck units of as many as needed. See page 19.

Two brooder stoves with the largest size hover (62 inch) are placed in each pen with a wire fence dividing the pen from front to rear. Chicks are started under each stove with sufficient room to care for the birds up to 8 to 10 weeks, if necessary, without excessive crowding.

The barrack house has many uses the year around. The following are some suggestions that have proved practical:

FEBRUARY 1st TO JUNE 15th

Chicks are raised for next year's pullet crop of layers. Also, during the last part of May and through the first part of June, broilers to be sold for meat can be finished off to better advantage than when allowed to fatten on range.



Cold scratching sheds make ideal conditions for early chicks.

A typical, well constructed permanent colony house.

DISINFECTANTS FOR HEN AND BROODER HOUSES

Liquid creosolis compound	1 to 50 water
Crude cobolic acid	2 to 50
Bichloride Mercury powder	1 oz.-8 gals.
Bichloride Mercury Tablets 7.7 grain	8 to 1 gal.

MASH HOPPER SPACE

Chicks 1 to 4 weeks	1 inch per chick
4 to 10 weeks	2 inches per chick
Pullets on range	3 inches per pullet
Laying hens	4 inches per hen

FORMULAS FOR WHITEWASH

Disinfecting whitewash
1 lb. commercial lye
2½ lbs. water slaked lime
5½ gals. water

WHITEWASH THAT WILL STICK

2 pecks unslaked lime
1 peck salt
3 lbs. rice flour
1 lb. glue
½ lb. whiting
Water to make 5 gallons

Slake lime in hot water, strain. Dissolve salt, stir into lime. Boil rice to thin paste and add whiting. Dissolve glue and stir in while adding enough water to make 5 gals. Let mixture stand for several days. It should then be heated before using.

KILLING FLIES

Use 1 teaspoon of formalin to 1 cup of milk. Place in shallow pans or saucer away from animals and humans. Replenish when milk dries up.

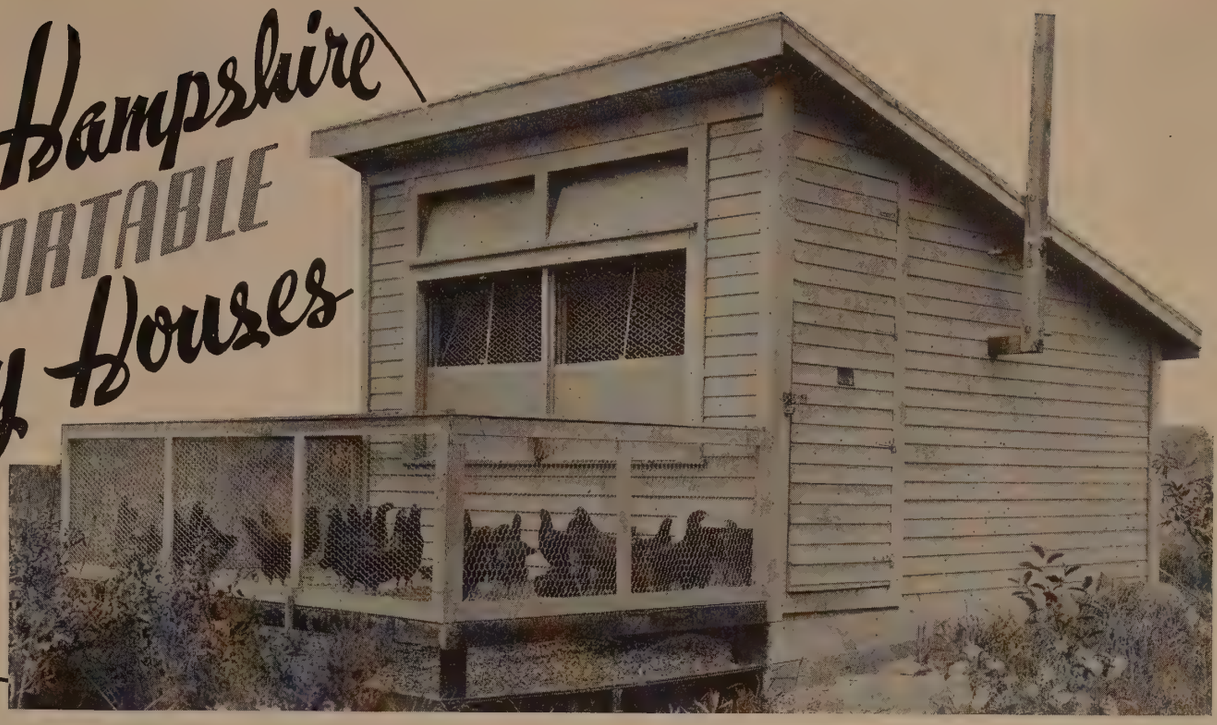
JUNE 15th TO NOVEMBER 1st

Hens not to be saved as breeders for the coming year can be transferred to the barrack house and held in production into late fall by the use of lights, fleshing pellets or wet mash. When the birds are transferred they should be given a wet mash to prevent a possible drop in production due to the change of quarters. Between August 1st and 15th, morning lights can be turned on and, when well cared for, it is possible to maintain 45% to 50% production into November.

This allows the holding of many layers of large eggs that would have to be sold to make room for the new laying pullets at a time of the year when big eggs are scarce and highest in price. It also provides plenty of time to get the pens cleaned, aired and ready for the new pullets.

Another system that may be used is to house the early hatched pullets that are ready to lay by the first of July and keep them in the barrack house until January or February when the house is again needed to brood chicks. At this time the best birds are taken into the laying house to replace the birds which have died or been culled out, and the remainder may be sold as fowl when the price of fowl meat is usually the highest.

New Hampshire PORTABLE Colony Houses



From University of New Hampshire Extension Circular No. 165 by A. E. Tepper, H. N. Colby and T. B. Charles.

These are small or large houses containing one brood unit and so constructed that they may easily be moved or located permanently, as occasion warrants. The size is usually within the units of 6′ x 8′ up to 12′ x 16′. The larger the structure the more unwieldy it becomes. Probably the most common size is the 10′ x 12′.

Since colony houses are designed for one brood unit, not more than 350 chicks should be brooded in any single unit. Apply the rule of allowing one-half square foot of floor space per chick up to 6 weeks of age, after which the number of chicks should be reduced one-half.

Individual heaters, either coal, oil, electric, gas or wood are used for each house.

The major advantages of the colony house system are: (1) low initial cost per unit, (2) low fire loss possibility because of small scattered units, (3) ease of construction, (4) mobility.

Major disadvantages are: (1) high upkeep cost, (2) high labor cost in operation, (3) liability of damage through moving.

Plans of a 10′ x 12′ brooder house included on next page.

BILL OF MATERIAL

FOR 10′ x 12′ BROODER HOUSE

FRAMING—Spruce, fir or native pine

FLOORING—Yellow pine, fir or spruce (matched)

SIDING—Douglas fir, yellow pine or native white pine

ROOFERS—Fir, yellow pine, or white pine

TRIM—Douglas fir, yellow pine or native white pine

RAFTERS:
- 6—2″ x 6″-14′

PLATES:
- 2—2″ x 4″-10′

FLOOR JOISTS:
- 7—2″ x 4″-10′
- 2—4″ x 4″-10′
- 2—2″ x 4″-12′

FLOOR TIMBERS:
- 2—6″ x 6″-14′

STUDDING:
- 6—2″ x 4″-4′ 6″
- 2—2″ x 4″-7′ 6″
- 3—2″ x 6″-7′ 6″
- 2—2″ x 4″-5′ 6″
- 2—2″ x 4″-6′ 6″
- 2—2″ x 4″-7′

SIDING:
- 350 bd. ft. white pine matched siding

ROOFING:
- 200 bd. ft. matched roofers

FLOORING:
- 150 bd. ft. matched flooring

TRIM:
- 2—1″ x 3″-5′ 6″ } Rear corners
- 2—1″ x 4″-5′ 6″ }
- 2—1″ x 3″-8′ 6″ } Front corners
- 2—1″ x 4″-8′ 6″ }
- 2—1″x4″-14′ Facia boards
- 2—1″x2″-14′ Eaves
- 2—1″x7″-12′ Rafter trim
- 1—1″x3″-4′ Chick exit
- 3—1″x4″-4′ Windows
- 1—1″x5″-8′ Window sill
- 3—1″x4″-2′ Ventilator
- 1—1″x6″-8′ Windows
- 2—1″x5″-9′ Window and ventilator
- 1—1″x8″-10′ Rear ventilator board

MISCELLANEOUS MATERIAL:
- 2—2″x4″-10′ Window framing
- 1—2″x4″-1′ 4″ Header over exit
- 2—2″x3″-3′ 6″ Header over ventilator
- 1—2″x4″-2′ 6″ Header over door
- 2—2″x4″-6′ } Track support and door slide
- 1—2″x4″-7′ }
- 1—1″x5″-14′ }

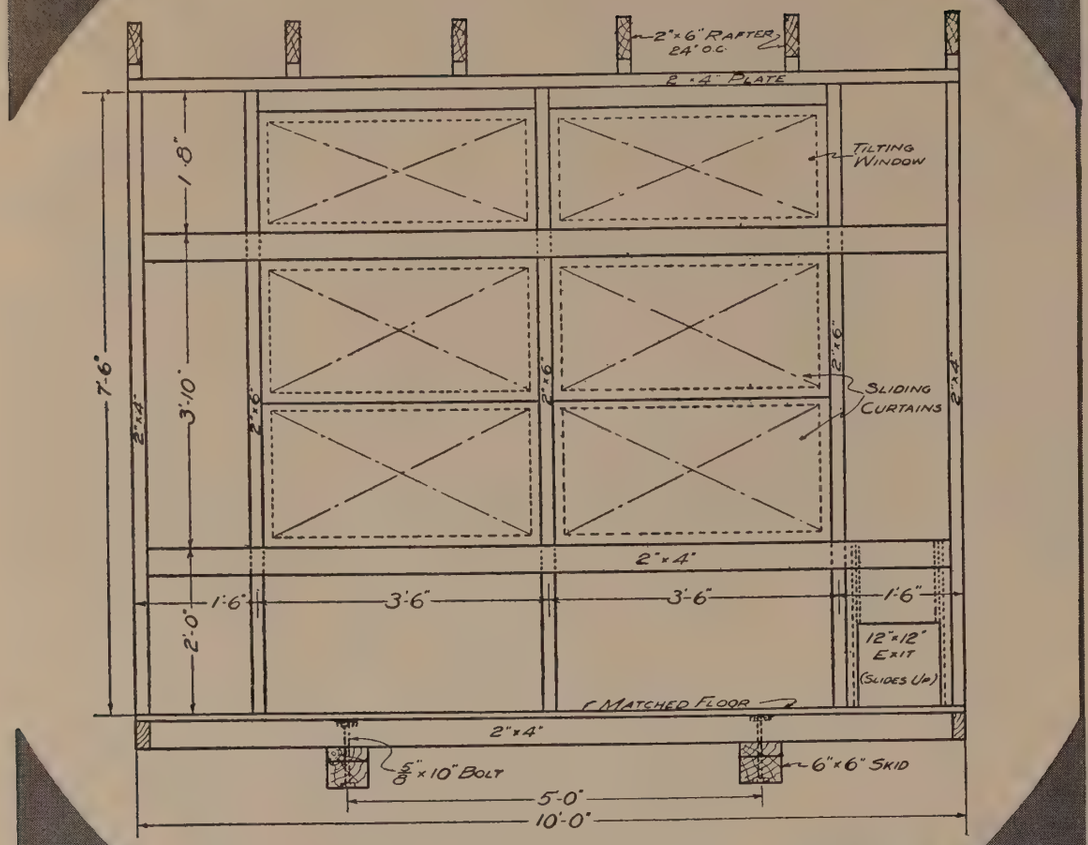
ROOST SECTION:
- 3—2″x4″-3′ 6″
- 3—2″x2″-10′
- 1—2″x4″-2′ 6″
- 1—1″x3″-10′
- 3—2″x2″-2′ 6″
- 3—1″x2″-10′

SLIDING CURTAINS AND GUIDES:
- 12—1″x2″-3′ 6″
- 12—1″x2″-2′
- 12—½″x½″-6′
- 4—½″x½″-2′
- 20 bd. ft. matched sheathing

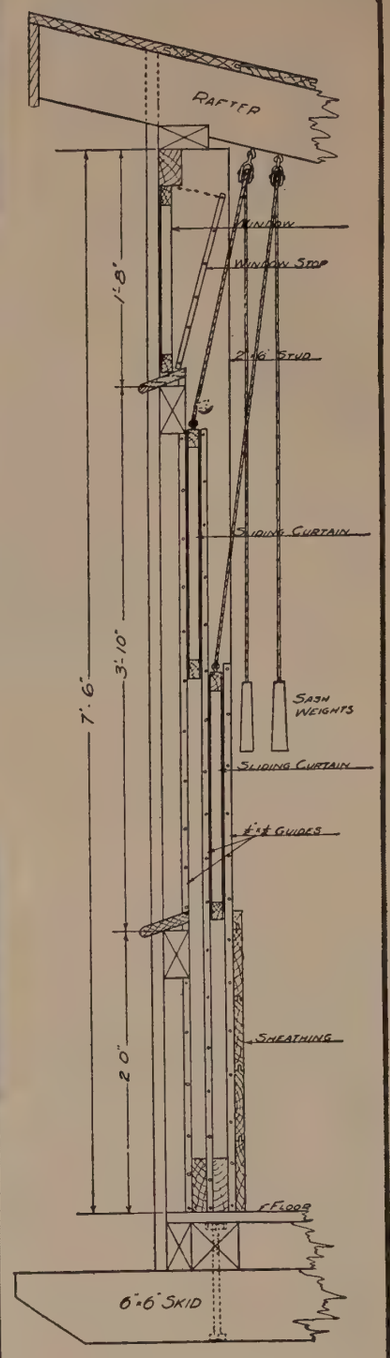
CHICK EXIT:
- 2—1″x3″-2′
- 1—1″x2″-1′ 1″
- 2—1″x1½″-2′
- 2—½″x½″-2′
- 1—1″x13″-1′

NAILS:
- 20 lbs. 8 d common
- 10 lbs. 20 d common
- 1 lb. poultry wire staples
- 15 lbs. 10 d common
- 2 lbs. finishing 8 d
- 2 lbs. 6 d finishing
- 1 box 7/16″ carpet tacks

HARDWARE:
- 2 rolls 3 ply roofing
- 1 piece glass substitute or muslin 4′x10′ 6″
- 1 piece 1″ mesh 19 gauge, galvanized poultry wire 4′x8′
- 1 piece 1″ 19 gauge mesh, galvanized poultry wire 2′x10′
- 50 ft. sash cord
- 4 sash weights
- 8—1″ galvanized pulleys
- 7—large screw eyes
- 11 large screw hooks
- 5—2″ strap hinges with screws
- 1—4″ T-hinge
- 4—⅝″x10″ galvanized bolts
- 1 pair sliding door hangers with bolts
- 6 ft. flat track with screws and brackets
- 1 lock and hasp
- 3 screen buttons — ventilator board

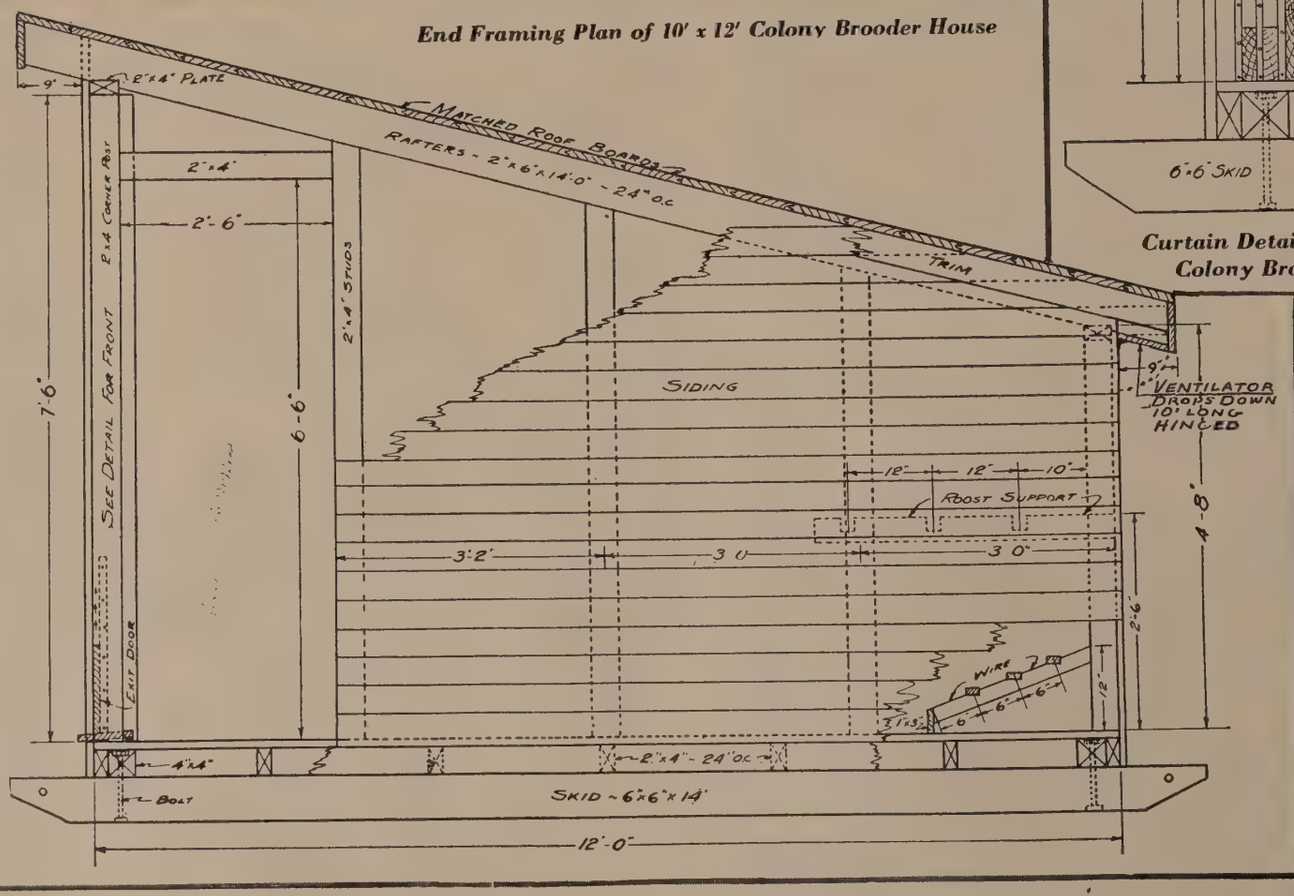


Front Framing of 10' x 12' Colony Brooder House



Curtain Detail of 10' x 12' Colony Brooder House

End Framing Plan of 10' x 12' Colony Brooder House



Range Shelters and Equipment

Due primarily to the inconvenience of moving colony houses yearly to fresh ground and the damage done to the houses, range shelters have come into popularity. Their lightness, better ventilation and wire platforms are contributing factors that have established them as highly desirable in rearing pullets during the summer months.

There are many types and designs, each enjoying its own particular advantages.

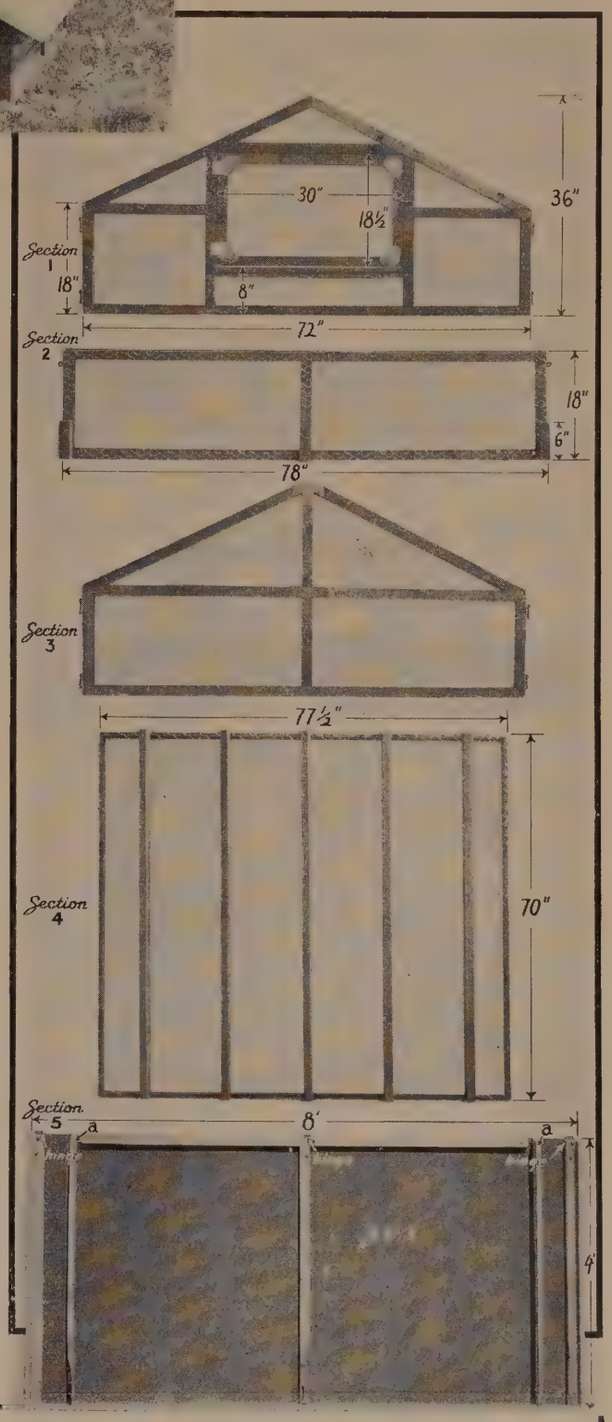
In general a shelter should have a wire base. Such construction not only keeps pullets away from their droppings but also provides adequate roosting space and ample circulation of air. The cooler the shelter the better, for on many ranges it is the only means of providing shade. Range shelters should be equipped with locks for night use to prevent marauding animals from reaching the pullets.

We show here two types of shelters, the New Jersey Collapsible Summer Shelter and the Park & Pollard Shelter as developed and used at Stongate Farm. Each has many desirable features which commend its use to the practical poultryman.

The New Jersey COLLAPSIBLE SUMMER SHELTER

The New Jersey Collapsible Summer Shelter is a practical, inexpensive shelter of a type widely used throughout the East for range rearing of pullets. Designed by Leslie M. Black, this type of shelter, suggested by the New Jersey Agricultural Experimental Station, is described by Prof. Willard Thompson in Everybody's Poultry Magazine as follows:

1. It is built in six sections; each simple to construct, easy for one man to handle, flat and therefore easily stored away out of season; quickly assembled and as quickly disassembled; easily moved from one spot to another.
2. It is designed for up to 60 growing pullets.
3. It makes an admirable home for growing pullets between the ages of 8 to 10 weeks and egg-laying maturity.
4. It is economical to construct, easily home made, and with proper care between summer seasons, will last for many years. The materials for one such summer shelter should not cost more than approximately $8. This will vary with different communities, of course.
5. It is sanitary in type of construction.
6. It is adequate protection for pullets during mid-day when its welcome shade is a protection against the burning sun. It is comfortable protection for the pullets during the hot summer nights.
7. Ease of moving insures against the wearing down of grass or sod in any one place, as is apt to happen when heavy houses are used on ranges.



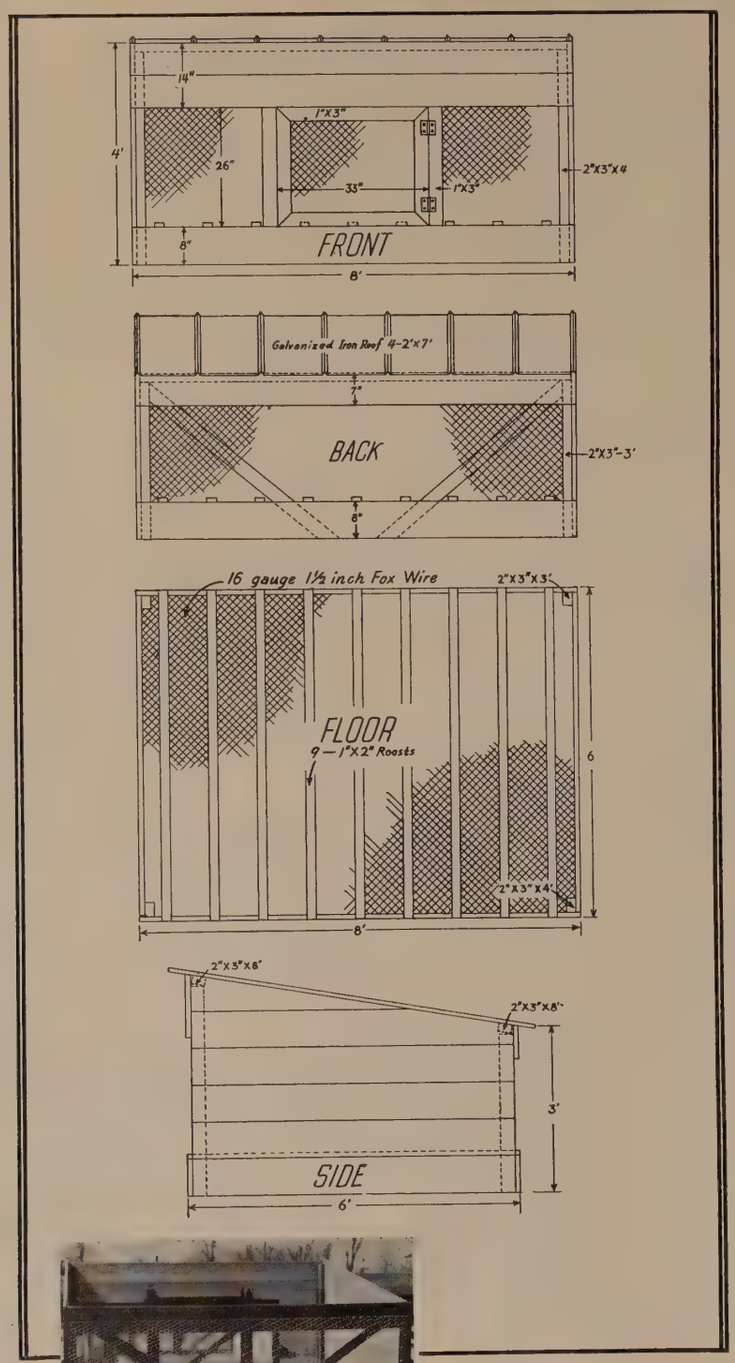
THE ACCOMPANYING ILLUSTRATIONS BECOME, IN THEMSELVES, AMPLE BUILDING PLANS

1. Section 1 is the front wall, with door. The measurements are indicated. Note the four simple hooks at outside of either corner, with which this section is attached at top and bottom to the two respective side wall pieces (Section 2). One-inch mesh netting is used for all sides, and 1½ inch mesh netting for the floor.
2. Section 2 is the side wall. Two of these are needed, of course. Note the small blocks which are nailed to the inner bottom sides of this section, 6 inches high, on which the floor section is to rest. The side wall sections are provided with eyes at top and bottom to receive the hooks on Sections 1 and 3. For all these frames shingle lath material is used.
3. Section 3 is the rear wall, and is similar to the front wall, except that there is no door needed in it.
4. Section 4 is the floor section. 2 by 2 inch material is used for the perches. The perches are approximately 15 inches apart. The frame of this section, as of the others, is made and it is not necessary to nail or fasten it in place.
5. Section 5 is the roof section. One side is shown in the illustration. The two roof sections are simply fastened together with hinges (3). The roof section, when complete, is fastened to the side walls in four places with hooks and eyes. Insulation board can be used for the roof. A pressed board, or glazed composition board, makes a splendid roof material, as it can be secured in 4 by 8 feet pieces, just the size needed for this construction. If the upper side of the roof section is painted white, it will be much cooler during hot summer days.

The two slats, marked "a" in the illustration, are so spaced as to come just outside the front and back sections when the roof is in place. The lath in the center is for re-inforcement, and to it is attached a hook for fastening the side to the center of shingle lath. This section simply rests upon the four 6-inch supports, the side wall section.

Park & Pollard RANGE SHELTER

Developed by Walter Wood and used at Stongate Farm



The Park and Pollard Range Shelter combines many features of convenience and serviceability to the poultryman. It is inexpensive to build, easy to construct and can be moved by two men or one man and a small truck. It is designed to hold from 75 to 85 mature pullets. It can be quickly cleaned of droppings by tipping on its back. One man can do this alone. Three sacks will bag it up tight for early spring use. Low roosts enable all chicks to roost at once. A catching coop which fits the door may be readily adapted to it. One man can thus drive the birds in for vaccinating, culling or catching at maturity without loss of time or undue disturbance to the chicks.

List of materials needed and construction details are as follows:

PARK & POLLARD SHELTER
List of Materials

Roof	4 sheets galvanized iron V crimp 2′ x 7′
Floor	Fox wire 16 gauge 1½ inch mesh 6′ x 8′
Base	2—1″ x 8″ x 8′ spruce boards
	2—1″ x 8″ x 6′ spruce boards
Front	2—1″ x 8″ x 8′ N. C. Pine Boards
Back	1—1″ x 8″ x 6′ N. C. Pine Boards
Sides	12—1″ x 8″ x 6′ N. C. Pine Boards
Roosts	9—1″ x 2″ x 6′ firring strips
Door	1—1″ x 3″ x 12′ N. C. Pine Board
Studs	1—2″ x 3″ x 14′ N. C. Pine Board
Roof	1—2″ x 3″ x 16′ Supports for metal roof

The base is first constructed out of the two 8-foot and two 6-foot spruce boards nailed to make a frame 8 feet by 6 feet. The fox wire is then firmly nailed on top of the frame and the 1″ x 2″ roosts nailed on top of the wire across the six foot width. There are nine roosts spaced 9½ inches apart, with the two end roosts 5 inches from the side. The base should then be turned over and the wire firmly stapled to the roosts.

The base is next turned right side up and a hole made in the wire at each corner to accommodate the 2″ x 3″ studs which stand upright to nail the siding on. The two front 2″ x 3″ studs are 4 ft. high and the backs are 3 ft. high. They should be nailed solidly to the base. The two front boards at the top and the one on the back can be nailed on first to steady the studs for nailing on siding.

The roof is made of four sheets of V crimp galvanized iron fastened with leadheaded nails to a pair of 2″ x 3″ x 8′ studs. The studs are placed at the front and back just the width of the shelter so that the roof may be taken off but will not slide. The roof can be hooked at the four corners to prevent it from being blown away.

The back and front openings are covered with one-inch mesh wire. The door is made to swing to the side.

Two braces should be placed on the back as shown in the diagram.

Above — Showing construction with roof removed.

Below — A good home on the range.

Right — Out on the range at five weeks.

Laying House Plans

The CONNECTICUT 24'X24' Two Story POULTRY HOUSE

Reprinted by kind permission of the author, Roy E. Jones, Poultry Extension Specialist, Conn. State College, and Everybody's Poultry Magazine.

For many years poultrymen have been trying to construct a poultry house offering sufficient protection to avoid extreme temperatures, and a front that would exclude beating storms from the south.

The new Connecticut 24 x 24 foot poultry house is a definite attempt to meet this need. For economical construction this building should be two or more stories high with a flat, built-up roof. For most economical operation it should be built into a hill or on land sufficiently uneven to allow unloading a truck on a platform level with the feed room on the second floor.

The outside walls of the house are of shiplap lumber painted, although where cheaper native lumber is available, the outside walls may be papered. For best results this house should be carefully insulated.

SLIDING WINDOWS

The sliding glass windows in the south side of this house exclude storms, yet allow free ventilation at all times. The air intake below the windows should have a one-inch opening with no adjustment. The air outlet above the windows, or the slot ventilation, should have a six-inch opening between the floor joists on the lower floor and a four-inch opening below the plate on the upper floor. These openings are supplied with an adjusting board.

Provision for a water system should be made before the floor is put in. Running water should be available. Water pipes should be brought in to a dry well located somewhere near the center of each pen, depending on the pen arrangement. If the sub-soil is gravelly or porous, a well with an interior about the size of a barrel, carefully stoned up, will accommodate the water pipe inlet and take care of drainage water from the fountain. If the soil is heavy, hard pan or poorly drained, a connection from the dry well to the tile drains beneath the wall or an outside drain should be provided.

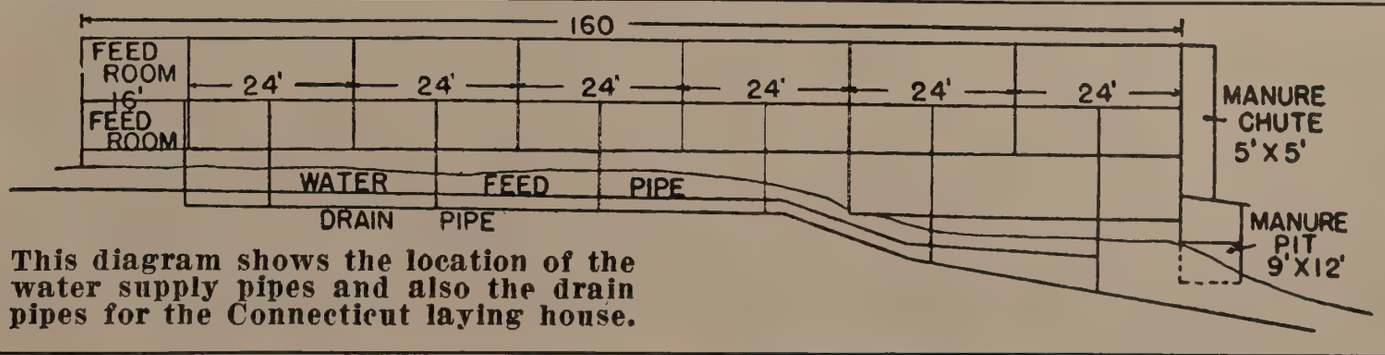
A stop and waste shut-off should be provided in the riser of each fountain unless adequate provision is made to prevent freezing. A water pan or fountain with an automatic float serves the need very satisfactorily. A small water pan or a wire floor or platform over a larger container or tub placed to catch the drip and drain into the dry well will aid greatly in maintaining a dry floor around the fountain.

A very satisfactory water fountain can be constructed by using a large tile, a galvanized pan and a range float.

For construction such as outlined in this article, stone or concrete foundations are necessary. Stone or concrete foundation and walls should not give trouble due to moisture provided they are properly constructed with tile drains beneath the walls where needed and sufficient grade away from the building to take care of surface water. The grade should be one foot lower than the top of the wall at a distance of four feet from the building.

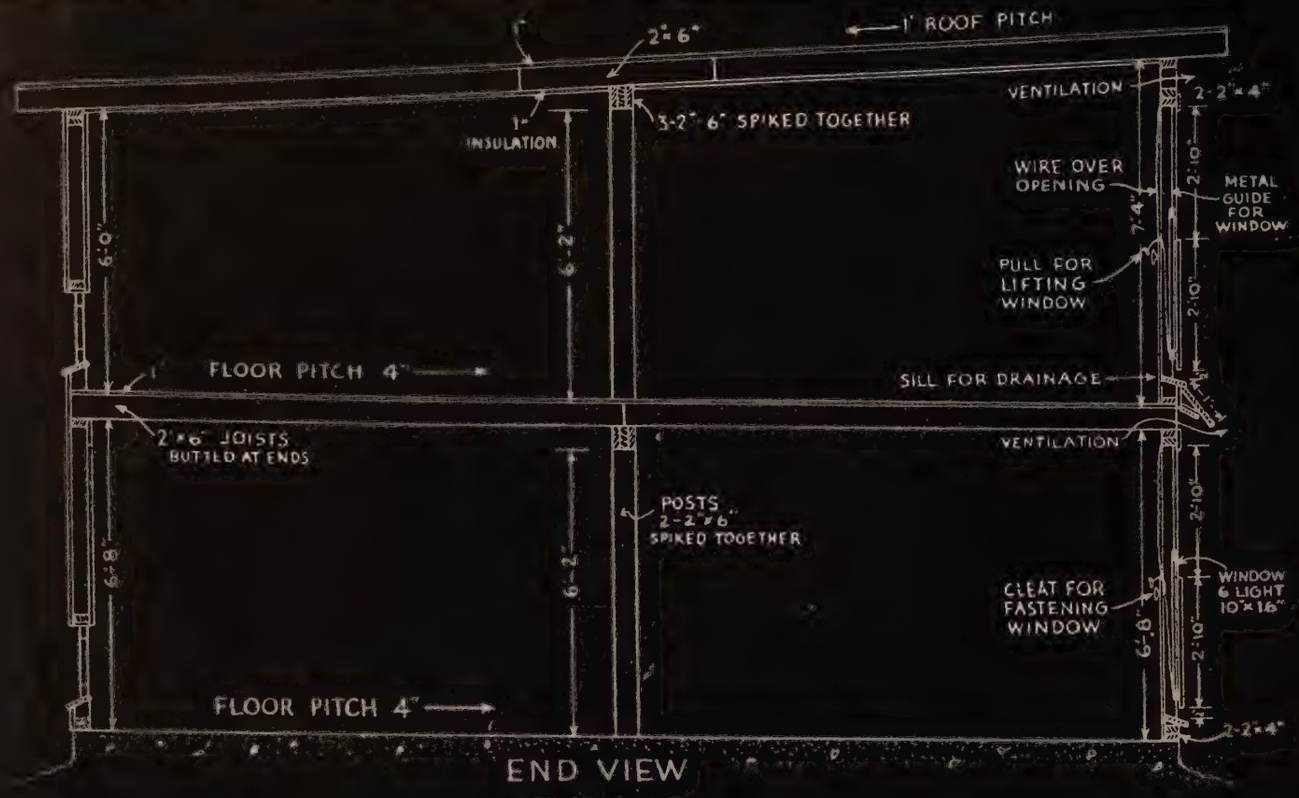
LAYING THE FOUNDATION

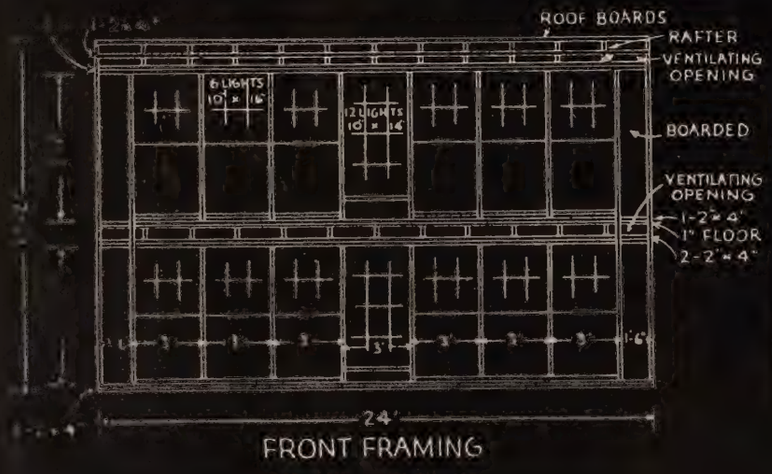
A poultry house foundation should be started by establishing levels and putting up lines with a floor pitch of four inches from back to front. A trench eight inches to a foot wide should be dug beneath the wall of the house, the outside of the trench being even with a line indicating the outside top of the

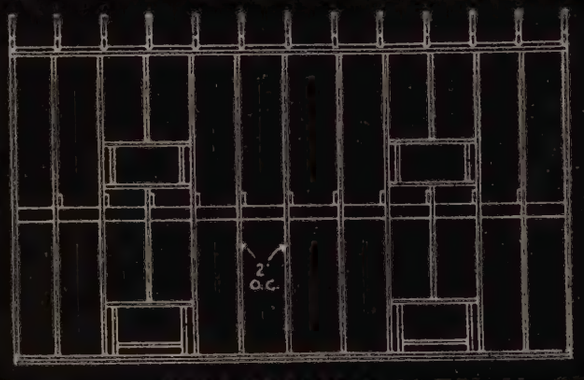


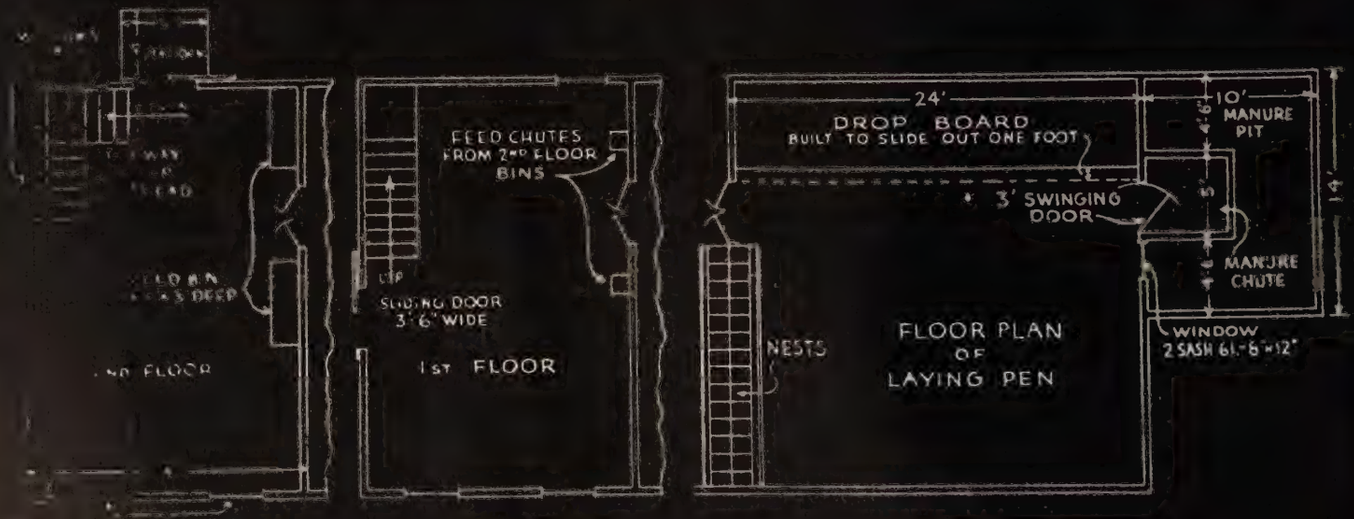
This diagram shows the location of the water supply pipes and also the drain pipes for the Connecticut laying house.

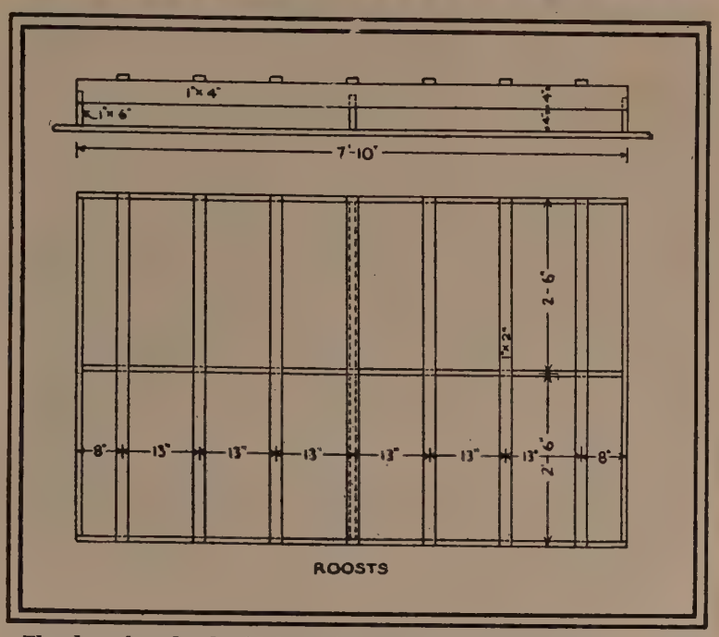
CONNECTICUT 24'×24' MULTIPLE UNIT LAYING HOUSE











ROOSTS

The drop boards should be 5 feet wide, 7 ft. 10 in. long, 30 inches from the floor, and run the entire length of the back of the building. It should be built to slide out from the back wall, so that it becomes part of the air circulating system. The roost frames, as shown in the diagram, have the same outside dimensions as the drop boards. The roosts are 1 by 2-inch lumber under which 16-gauge, 1½ inch mesh wire has been fastened to the frame to keep the hens out of the droppings and to prevent eggs from going through to the droppings.

finished wall. The depth of the ditch should be such that the bottom will be approximately two and one-half feet below the outside grade when construction and grading are finished.

The ditch may be filled with loose stone up to within a few inches of the surface. If a stone or concrete wall is to be laid, it should be continued from this point. If a smooth outside wall surface is desired, the rafters to be used in the building may be used for building forms.

If a reasonable supply of stone is available, there is no need for a form on the inside of the walls as this can be of rough stone construction with concrete between the stones and against the form on the outside.

The floor foundation should be filled in with stone and leveled with gravel or cinders. If the foundation has been carefully tamped so that it will not settle and the concrete is made from good material, well mixed, the concrete floor needs to be only two or three inches thick. Use a 1-2-3 concrete mixture, that is, one part cement, two parts of sharp sand and three parts sifted gravel or crushed stone. The concrete should be thoroughly mixed, using as little water as possible in producing a mixture that can be handled and leveled; for the above mixture, use 4½ gallons if the sand is damp and 5½ gallons if the sand is completely dry.

LAYING THE CONCRETE

If bank run of sand and gravel is used, a 1 - 4 mixture is best. If conditions are such that moisture may work up from below, use a sub-floor washed over with hot asphalt or, better still, covered with roofing paper. Cement the seams and paint with hot asphalt. The top coat, one inch thick, should be a 1-2-2 mixture if sand and screened gravel are used; or a 1-3 mixture if bank run sand and gravel are used. If the work is done in cold weather, drying may be hastened and some protection from frost provided by adding two pounds of calcium chloride for each bag of cement. This must be dissolved in the water before the mixture is put together.

Bolts should be set in the concrete at the edge of the foundation about 12 ft. apart so that the sills can be securely bolted down. As the floor pitches four inches from back to front, drains should be provided beneath the sill in the front of each pen to dispose of water when the floor is washed with a hose. When the floor is ready for construction it should be smoothly finished; dry wells should be provided for the water fountains, the sills bolted down in place and possible air leaks beneath the sill carefully checked by pointing with cement.

BUILDING DETAILS

SILLS—The sills are two 2 in. x 4 in. spiked together. Eighteen-foot lengths are specified because they cut to advantage to break joints and make corners. The sills should be bolted to the foundation and pointed up with cement if necessary underneath.

POSTS—Two 2 in. x 6 in. spiked together for posts should set up with 6-inch dimensions lengthwise of the house. The post should be placed 12 feet apart on centers. Double 2 in. x 4 in. studs will serve as posts in the partition. The posts should be cut 6 ft. 2 in. long as this is the minimum head room allowed in the building.

FLOOR AND ROOF SUPPORTS—The floor and roof supports are three 2 in. x 6 in. spiked together. They should start off at the end of the building with a 12 ft. and two 24 ft. sticks and continue with 24 ft. sticks, which will break joints throughout the length of the building.

FLOOR JOISTS—2 in. x 6 in. x 12 ft.—The floor joists may be butted together at the center with pieces of board nailed across the joint to prevent spreading. The floor joists should be placed 2 feet apart on centers.

RAFTERS—2 in. x 6 in. x 14 ft.—As it will be necessary to purchase 14 ft. sticks, the rafters may be set up to overlap 2 feet. The rafters should extend out 1 foot at the front and the rear for overhang. They should be placed 2 feet apart on centers to accommodate insulation board, which is usually 4 feet wide, on the ceiling.

STUDDING—The studding should be 2 in. x 4 in. throughout. The studs at either end of the windows on the front and the studs in the rear should be one piece straight through to the plate. The remainder of the studding on the lower floor at the front of the building should be cut 6 ft. 2 in. long with a double plate below the floor joint of the second floor. The studding for the front of the second floor is spaced the same as for the first floor, except that the studs should be cut 6 ft. 6 in. long. At the front of the top story a double plate is placed four inches below the single plate, allowing slot ventilation openings without an interruption in air circulation which would, perhaps occur if the double plate was next to the rafters.

PLATES—The plate at the rear is two 2 in. x 4 in. spiked together. The plate at the front is a single 2 in. x 4 in. under the rafters with a double 2 in. x 4 in. four inches below, above the windows. A 4-inch space at the extreme top of the front of the pen is the slot for ventilation.

FLOORING—Full 1 in. or 1¼ in.—A single floor is satisfactory if it is of good quality and a full inch or an inch and a quarter thick. The heavier flooring will be worth while in the long run, although it may be slightly more expensive at the start. If a double board floor is used, the boards should be lapped half and securely top nailed with 10 d nails.

ROOF BOARDS—The roof boards should be of good quality, carefully fitted together and securely nailed. The roof boards should extend out about 8 inches on either end of the building to allow for trimming to compare with a foot overhang front and back.

FRONT WINDOWS—6-light barn sash 10 in. x 16 in. glass and 12-light storm sash 10 in. x 14 in. glass.—The 6-light front windows with 10 in. or 16 in. glass should be placed between the studs set three feet apart on centers. Barn sash with 6-light 10 in. x 16 in. glass are 34 inches wide and 37 inches high. The windows should be installed so that the sash will slide down out of sight when the window is open and allow a two-inch lap at the bottom of the window when it is closed. The sash should be held flush with the outside boarding, allowing only sufficient space to slide up and down easily and held in position by a cleat of inch-square material nailed against the studs. The cleat should be nailed above the inside boarding at the bottom of the window so that it may be removed and the windows taken out if necessary.

A 1-inch air intake above the sill should be allowed at the bottom of the window as this is a part of the ventilating system. The windows may be raised and lowered by a cord fastened to the bottom of the center of the window frame and passed over a pulley fastened to the plate at center of the top of the window. This cord may have a short piece of 1 in. x 1 in. tied in the end to prevent its going back through the wire screening. When the window is lifted, it may be fastened on a cleat nailed against the boarding on the inside of the front or a special fastener may be used.

This fastener is made from two pieces of 1 in. x 2 in. x 9 in. One piece is fastened securely to the inside boarding below the window. The other is fastened to swing on a screw located three inches from the locking end and a little above the center of the cleat. The six-inch end of the locking cleat supplies weight to hold the cleat in position. The space between the ends of the two cleats should be about half the diameter of the cord used.

Six of these barn sashes are required for each pen. One storm sash 12-light 10 in. x 14 in. glass should be located in the center of each pen, hinged at the side to swing in like a door. A wire door to be used when this window is open should be hinged on the post opposite the side from which the window is hung. This wire should be so constructed that it can be closed to protect the window when the window door is closed, and closed to keep the poultry in when the window is open.

BACK WINDOWS—3-light 10 in. x 14 in.—The two sashes in the back should be 6-light, 10 in. x 14 in. glass

cellar sash placed 12 feet apart with the top of the window sill eight inches above the floor. These windows may be constructed to open by sliding sideways, swinging in or taking out, whichever is convenient. There should be one window in the center of each 12-foot section or two windows in each pen.

SLOT VENTILATION ABOVE FRONT WINDOWS—The slot ventilation system allows a 6-inch opening above the plate between the floor joints on the first floor and a 4-inch opening above the windows and beneath the single plate supporting the rafters on the second floor.

These ventilators may be closed by a board on the outside hinged to swing up. The board may be held in any position desired by a piece of strap iron filled with holes, such as is used for hanging steam pipes. One end is attached to the bottom of the swinging board and the other put over the head of a finished nail driven in the plate. The inch opening above the window sill at the bottom of the window below the front boarding is a cold-air intake and part of the ventilating system. The cold air enters the pen at the top of the inside boarding half way up the front of the pen. The wire over the windows is fastened to a frame hinged at the top to swing in. The inside boarding below the windows should be low enough so that the wire frame is no higher than the front of the top of the boarding outside of the window. If the window runs are so nailed that they can be removed and the windows taken out from the top, and the window sill and lower part of the window run are carefully painted. The inside boarding over the window run may be nailed in permanently.

WIRE OVER WINDOWS AND VENTILATORS — One-Inch Mesh—The wire over the front windows should be 1-inch mesh fastened to a frame hinged at the top to swing in. The frame should be of 1 in. x 2 in. material so placed that it will not shut out the sun. The wire over the slot ventilation may be inch-mesh or a six-inch strip of ⅛ in. or ½ in. mesh hardware cloth. The wire over the rear windows should be inch-mesh placed on frames that can be swung open to allow opening and closing the back windows.

BOARDING—NOVELTY SIDING—A good quality of thoroughly dry novelty siding should be used on the side walls. This should be carefully laid and painted at once to prevent checking. If the novelty siding is squared at the top in front of the windows and a 1 in. x 4 in. is nailed on the studding between the windows, no further finish is required for the front except the casing around the storm sash used as a door, hinged inside to swing in. Novelty siding makes a very good looking finish when painted, but it is not so warm as matched boards and paper unless the house is insulated.

PARTITION BOARDING—The partitions should be tightly boarded to the ceiling. A section of the top of the partition between the middle post and the front wall may be constructed to open in summer for cross ventilation, but the partitions should be tight for proper winter ventilation. The partition doors between pens may be double doors 20 inches wide on double-action hinges if a carrier is to be used in the house or they may be 40-inch single doors with one-way hinges and a latch. If double doors are used, the double-action hinges should be heavy enough to keep the doors from swinging with the wind. The doors should come down to within six inches of the floor. The remaining space should be filled by a movable board which can be taken out at the time of cleaning. The board is necessary to bring the bottom of the door above the litter. The door must be cut out at the top to accommodate the track, if a track and carrier are used.

A CARRIER FOR FEEDING AND CLEANING—If the house is several pens long, a carrier is convenient and a labor saver in feeding and cleaning. The carrier track should run the length of the building just in front of the drop boards. The type of track with a 4-inch truck should be used as there is no head room to spare at the point where the track must be hung. This is particularly true of the top floor. If both the feed room and manure chute are part of the construction, it may be desirable to have two carriers, a platform carrier for feeding, which would be kept in the feed room, and a dump carrier for cleaning, which may be kept in the manure chute.

FEED ROOM CONSTRUCTION—It is difficult to give details for feed room construction because each man's feed room requirements may differ. The door from the feed room into the first laying pen should be heavy and tightly built with strong, double-action hinges because this door must be kept tightly closed during cold weather. The feed room acts as a vestibule when entering the poultry house. If the room is in the upper story the floor should be strengthened by using an extra 2 in. x 8 in. carrying beam and placing the 2 in. x 6 in. floor joists a foot apart rather than two feet apart. The location of the outside feed room door and unloading platform may vary with the location of the poultry house relative to higher surrounding ground.

The best location for the feed room stairway may be determined by other activities or local conditions. In general the stairway is best located at the rear outside corner of the pen, with a landing half way up and short steps to each of the two floors.

MANURE CHUTE AND PIT—When a long house is equipped with a carrier for cleaning drop boards, a manure chute and pit is a worthwhile investment. The manure chute should be at least 5 feet square, allowing room for dumping a litter carrier, and the manure pit should be 10 ft. x 12 ft. or larger, depending on the size of the house and the frequency with which the pit will be cleaned. The manure pit should be open on one side and the chute should be ventilated at the top.

GUTTERS AND DRAIN PIPES—Gutters and drain pipes are worth while on a poultry house, particularly with a double pitched roof construction where the drip from the front roof may be blown in or against the front windows. Either metal eaves troughs or wooden gutters may be used. Wooden gutters should be put up in sections as long as possible. They must be built in at the time the house is constructed, they must be very carefully connected and painted and given sufficient pitch to carry off the water. Wooden gutters are very difficult and unsatisfactory to repair when not properly constructed. Metal gutters may be added at any time but had best be made a part of the new construction, if the house is long, several drain pipes to the ground may be needed.

Bill of Material

Bill No. 1—Two-story section with two outside ends.
Bill No. 2—Two-story section with one inside partition.
Use No. 1 for the first section and No. 2 for each additional section.

		Bill No. 1		Bill No. 2	
		NO. OF PCS.	BOARD FT.	NO. OF PCS.	BOARD FT.
Sills	2"x4"x18'	16	192	11	122
Studding, Plates and Drop Board Frame	2"x4"x16'	70	747	60	640
Posts (two 2x6 spiked together)	2"x6"x14'	2	28	2	28
Floor and Roof Supports	2"x8"x24'	4	128	4	128
Floor Joists	2"x6"x12'	26	312	24	288
Rafters	2"x6"x14'	26	364	24	336
Window Sills (finished)	2"x6"x12'	5	60	5	60
Flooring—full 1" or 1¼"			700		700
Boarding for Roof, Sheathing, Drop Boards, etc.			2,500		2,200
Novelty Siding			1,400		600
Roost Frames	1"x6"x10'	9	45	9	45
	1"x4"x16'	9	48	9	48
	1"x2"x10'	21	35	21	35
Nests	1"x12"x12'	7	84	7	84
	1"x4"x14'	8	36	8	36
	1"x2"x14'	8	29	8	29
Window Runs	1"x1"x12'	12	12	12	12
Frame for Wire over Windows	1"x2"x12'	14	28	14	28
Slot Ventilation Boards	1"x6"x16'	3	24	3	24
Trims for Corners, Windows, etc.	1"x4"x12'	5	15	5	15
	1"x3"x12'	8	24	4	12
	1"x2"x12'	8	16	4	8
Roof Trim and Visor	1"x12"x12'	6	72	6	72
	1"x8"x12'	12	96	4	32
Area to be Covered with Built-Up Roof (4 ply)		676 sq. ft.		624 sq. ft.	
Windows—Barn Sash—6-light, 10"x14" glass		12 sash		12 sash	
Windows—Storm Sash—12-light, 10"x14" glass		2 sash		2 sash	
Windows—Cellar Sash—3-light, 10"x14" glass		4 sash		4 sash	
Wire for Roosts—16-gauge 1½" mesh, 5' wide		48 feet		48 feet	
Wire for Windows, front and rear, 1" mesh, 3' wide		60 feet		60 feet	
Hardware Cloth—½" mesh, 6" wide		48 feet		48 feet	
Hinges for Roost Lighting Boards		4 pr. 6" T		4 pr. 6" T	
Hinges for Storm Window		2 pr. 4" butts		2 pr. 4" butts	
Hinges for Rear Window		4 pr. 3" butts		4 pr. 3" butts	
Hinges for Slot Ventilation		6 pr. 4" T		4 pr. 4" T	
Nails—Wire		100 lbs. 8 d.		100 lbs. 8 d.	
		20 lbs. 10 d.		20 lbs. 20 d.	
		20 lbs. 20 d.		20 lbs. 20 d.	
Nails—Finish		2 lbs. 6 d.		2 lbs. 6 d.	
		2 lbs. 8 d.		2 lbs. 8 d.	
		2 lbs. 10 d.		2 lbs. 10 d.	
Wire Staples		3 lbs.		3 lbs.	
Pulleys for Windows (1" diameter)		1 doz.		1 doz.	
Window Cord for Lifting Windows		100 feet		100 feet	

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The PENN STATE 20' X 40' Laying House

This 20 x 40 foot unit will comfortably accommodate 200 laying fowls. If only half of this number of fowls are to be housed, the building may be reduced in size to a 20 by 20-foot unit.

There are four double windows in the front of the 20 x 40-foot unit. These slide up and down on ropes similar to windows in a home. It is possible during the hot summer months to remove all windows, thus permitting the disinfecting action of direct sunlight. During the other seasons of the year, the upper sash may be used for ventilating.

The space between the windows is given over largely to muslin curtains; three in each 20 x 20-foot section. These are arranged to slide up and down on the outside of the house. Four small steel springs are used on each curtain, and since the curtains are counter balanced by weights, they may be held at any desired height. These curtains are covered with unbleached muslin, though some farmers use burlap, heavy cheese cloth, glass substitute or similar products.

To provide protection, a frame covered with 2 x 2-inch hardware cloth is made for the inside of each of these curtain openings. These frames are hinged at the top, swing up and hook to the rafters. This allows the muslin curtains to be raised or lowered from inside the house. When it is necessary to change litter, the truck or wagon may be drawn up to the front of the building, the curtains lowered, the wire frames hooked up and the litter removed through these openings.

The construction of the sliding curtains on the outside of the building is an advantage over those which swing up on the inside of the building, since they are easily constructed and can be regulated from the outside without disturbing the hens.

WINDOWS AT REAR ALSO

In the rear of each 20 by 40-foot unit are four single sash windows. These provide light on the floor where it is sorely needed in the late afternoon. During several months of the year, these windows are raised to provide additional ventilation.

The type of roof is a two-thirds span or combination. A shed roof is easier to construct, but is not adapted to a building 20 feet deep for the reason that in order to obtain sufficient pitch to the roof, it would be necessary to have the front of the building unnecessarily high or the rear too low. King, in 1910, stated that 1,000 pounds live weight of fowl breathed nearly four times as much air in 24 hours as a 1,000 pound cow. Thus, the problem in poultry house construction is one of providing frequent changes of air where the birds can take advantage of it. A free movement of air is more important than mere volume.

In this unit, the studs are of 2 x 4-inch material, are 4 feet 8 inches high in the rear, and 6 feet 10 inches high in front. Three posts 4 inches by 4 inches are used to support the roof and 2 by 6-inch rafters are butted against and spiked to a 3 by 10-inch beam at the peak of the house. Two by four-inch material is used for the plates. The front, ends and rear of the house may be single boarded with tongue and groove siding, unless other construction is desired. All roofing boards, dropping boards and interior partitions should be of matched lumber. The rafters in front are projected 12 inches to provide protection against beating storms.

The house is ceiled over the roosts and a rear 6 inch ventilator extending the length of the house provides an intake for fresh air. Other openings in the front of the house provide an intake for fresh air. Still other openings in the front of the house between the rafters provide additional ventilating facilities.

INSULATION PAYS FOR ITSELF

The use of insulation in the construction of the Penn State Laying House will make it cooler in summer and warmer in winter. Insulation pays for itself in a season or two, for in a climate like that of Pennsylvania, a flock will not be subjected to the changes in temperature in an insulated house as it would be in a house that is not insulated. Egg production can be maintained at a steadier rate, and there is not the danger of the production rate going into a tailspin whenever there is a drop in the outside temperature.

INTERIOR FURNISHING

The interior furnishings of the 20 by 40-foot house consist of 40 nests arranged in four batteries each double-decked. One battery of 10 nests is placed on each end wall and on either side of the partition which divides the unit into two equal 20-foot sections.

Two broody coops, one above the other, which can also be used during the breeding season when males are alternated, are constructed adjacent to the nests. The water stand is portable and four mash hoppers, each 5 feet in length, are suspended by chains from the ceiling. This provides for the maximum use of floor space and is to be preferred to that of the orthodox stand construction.

DIFFERENT ROOST ARRANGEMENT

In a 20-foot unit, the roosts are divided into three sections. Two of these sections are each 3 feet wide, 5 feet long, with three roosts each; the other section is 6 feet wide, 5 feet long, with six roosts. The 20 by 40-foot unit is thus provided with 24 roosts each 5 feet in length, extending from the rear toward the front of the building. This arrangement is to be preferred to the usual method of constructing the roosts lengthwise of the building since the birds can be more easily handled on the roosts and the fowls are provided with a better circulation of air. Recently we have improved the construction of the dropping boards by applying one inch of concrete over the wood to which has been tacked chicken wire. This provides a smooth surface and aids materially in removing the droppings.

Bill of Material

PENN STATE LAYING HOUSE

USE	QUANTITY	SIZE	LENGTH	
Sills	6	2″ x 6″	12′	
Sills	6	2″ x 6″	10′	
Sills	1	2″ x 4″	14′	
Plates	6	2″ x 4″	10′	
Plates	6	2″ x 4″	12′	
Plates	3	2″ x 4″	8′	
Studding	11	2″ x 4″	10′	
Studding	2	2″ x 4″	12′	
Studding	6	2″ x 4″	14′	
Studding	2	2″ x 4″	16′	
Posts	3	4″ x 4″	10′	
Framing	4	2″ x 4″	12′	
Framing	1	2″ x 2″	12′	
Window Sills	3	2″ x 6″	12′	
Window Sills	1	2″ x 6″	15′	
Rafters	17	2″ x 6″	16′	(rear span)
Rafters	17	2″ x 6″	8′	(front span)
Ridge pole or purlin	2	3″ x 10″	20′	
Roosting rails	12	2″ x 2″	10′	Upper edge rounded
Roosting rail supports	3	2″ x 2″	12′	
Roosting platform	150 bd. ft.	1″ x 4″	¾″	T and G flooring
Roosting platform supports	8	2″ x 4″	10′	
Roosting platform supports	7	2″ x 4″	12′	
Siding	700 bd. ft.	Novelty for back, ends and front		
Roof boards	1050 bd. ft.	1″ x 8″	10′, 12′, 14′	shiplap
Two-thirds partition	100 bd. ft.	1″ x 6″	10′, 14′	T & G sheathing
Ceiling for roost cabinet	400 bd. ft.	T & G sheathing		
Alternative:				
Ceiling for roost cabinet	320 sq. ft.	½″ insulation board		
Protection for insulation on back wall	40′	Fly screen 2′ wide (apply over insulation)		
Trim (windows, corners, etc.)	10	1″ x 4″	10′	No. 2 white pine or select yellow pine
Trim (windows, corners, etc.)	8	1″ x 4″	12′	No. 2 white pine or select yellow pine

MUSLIN CURTAINS AND WIRE FRAMES FOR WINDOWS

Frames	290 lin. ft.	1″ x 3″		
Slides and stops	60 lin. ft.	1½″ x 2″		
Slides and stops	48 lin. ft.	1½″ x 3″		
Slides and stops	50 lin. ft.	1″ x 4″		
Slides and stops	32 lin. ft.	1″ x 5″		
Slides and stops	100 lin. ft.	1″ x 2″		
Slides and stops	12 lin. ft.	1″ x 1″		
Auxiliary ventilators	80 sq. ft.	½″ Insulating board or T & G ceiling: Inside under curtain openings		
Auxiliary ventilators	2	1″ x 8¾″	12′	No. 2 white pine
Auxiliary ventilators	2	1″ x 5¾″	14′	No. 2 white pine

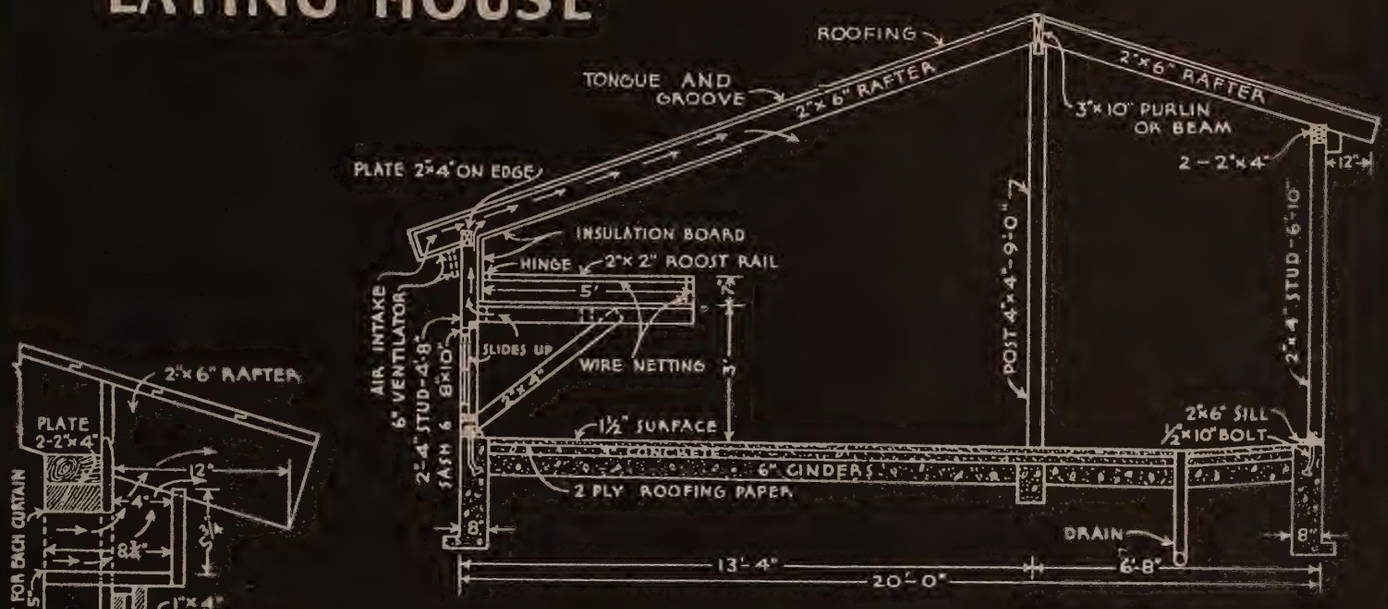
HARDWARE, ETC.

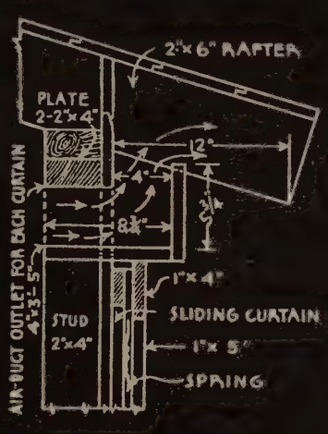
Roofing paper (3-ply)—11 rolls (roof)
Door—1—3′ x 6′6″
Windows—10 sash 6 light 10″ x 12″
Windows— 4 sash 6 light 8″ x 10″
Bolts—12 ½″ x 10″
Wire netting—45 ft. 3 ft. wide for frames inside windows and curtain openings
Muslin (or Glass Substitute) — 7½ yards (36″ wide)
Nails, hinges, tacks, lock, paint, etc.

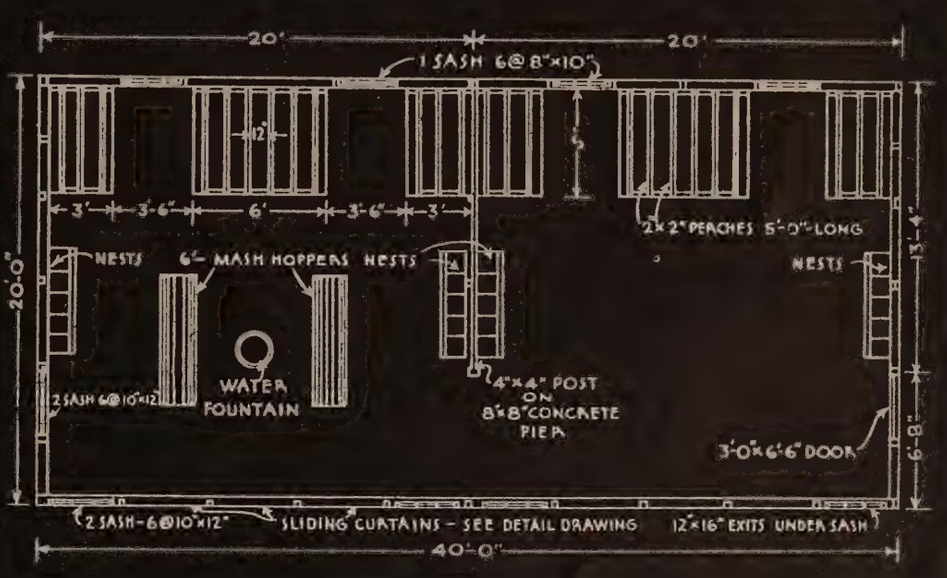
FOUNDATION AND FLOOR

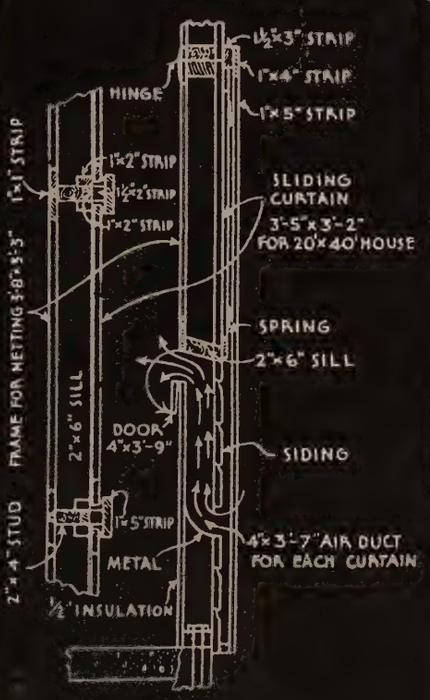
Cement—92 bags
Sand—8 cu. yards
Stone—16 cu. yards
Roofing paper (2-ply)—8 rolls (insulating floor)

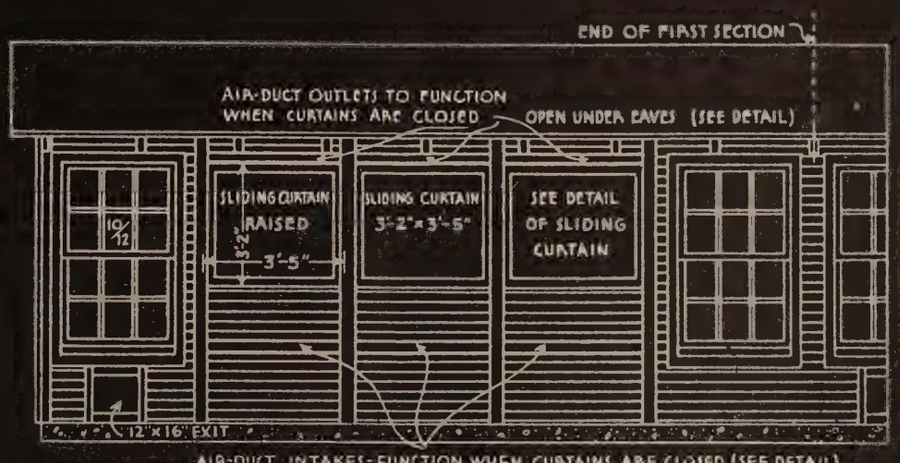
PENN STATE 20'×40' COMBINATION ROOF LAYING HOUSE





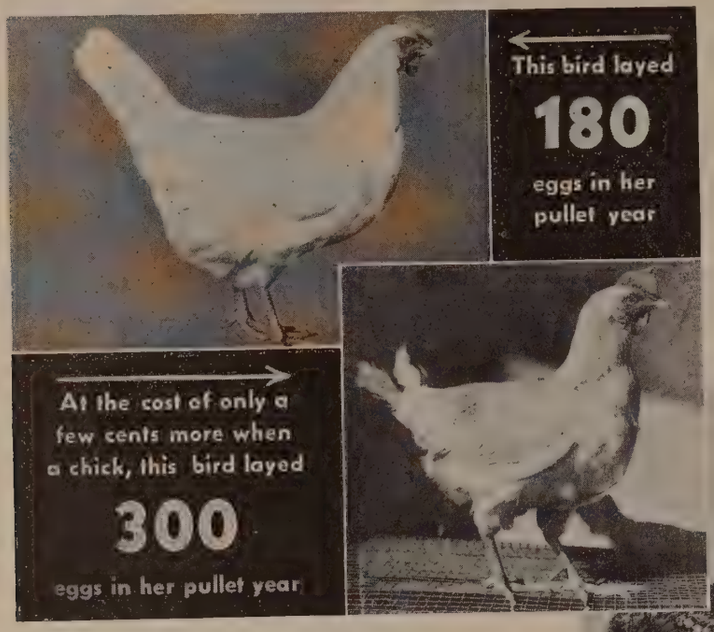






MONEY-MAKING Management

Too much emphasis cannot be placed on the importance of sound management if the poultry farm is to be a money-maker. Management problems are continually arising and never cease to exist. Failure to solve them correctly inevitably means a costly loss. Understanding the rules of sound management in advance and putting them into practice is the poultryman's greatest asset and surest indication of profitable operation. The following rules are based on Park & Pollard experience over a period of 35 years. The soundness of each has been definitely proved. We submit them, confident, that their adoption by progressive poultrymen cannot fail to result in a substantial increase in poultry profits.



1. PURCHASE GOOD STOCK

The importance of obtaining hatching eggs or baby chicks from stock of high vitality, livability and health deserves never-ending emphasis.

Baby chicks even from the highest production stock, are of little value if they do not possess high vigor and health — due to their inability to develop into healthy, rugged birds capable of fulfilling the demands of high production.

Baby chicks should be selected from the type of stock best suited for the results desired. The requirements are quite different for chicks intended for layers as compared with those going for broilers only.

2. HOW TO CHOOSE STOCK FOR LAYERS

The important factors to consider in buying baby chicks or breeding for layers is the amount of production, egg size, broodiness, rate of maturity, size of birds, and resistance to disease of the parent stock.

A. Pick a Highly Productive Strain. Many factors tend to influence production downward. Unless inheritance is well fixed for high production in a strain of birds, no amount of GOOD FEED and GOOD CARE can raise the production level.

It is highly essential to purchase stock from a breeder known to have high production. Good stock should average at least 160 to 180 eggs per bird. Some strains of birds average consistently 200 eggs or better yet cost but a few cents more per chick. The desirability of purchasing this type of stock, whenever possible, is self-evident and urgently advised.

B. Be On The Watch For Egg Size. Egg size is equally as important as egg production, in determining the choice of stock. Consider not only the average egg size for the year but the time required for the pullets to reach normal egg size. The size of the eggs laid is mainly determined by breeding, but can be influenced to some degree by the manner in which the pullets are raised. Pullets forced into maturity before they reach full size are so handicapped that they lay a larger number of small eggs.

Some very high laying strains are badly handicapped by the number of small eggs laid throughout the year. In selecting laying stock never fail to check egg size. It has a vital bearing on the money you will make.

C. Beware of Broodiness. Broodiness can only be eliminated through careful breeding. It tends not only to lower yearly production but entails considerable extra labor and bother in breaking up the setters. Hens setting on eggs throughout the day unquestionably lowers the quality of eggs. Be careful when you buy stock that you don't buy broodiness with it!

D. Check Rate of Maturity. The length of time taken for a strain of birds to mature and start laying is of extreme economic importance to you. Strains that mature too fast frequently produce pullets that fail to lay large eggs or cannot stand heavy production over a long period of time. Very slow maturing pullets are also a handicap to the profit-minded poultryman. Eggs are scarce and high at the season when pullets are coming into lay. A month's production in late summer or early fall is worth two months production during the spring months. Always check rate of maturity in choosing laying stock.

E. Analyze The Size of Birds. Size of birds is closely related to their ability to handle feed and produce eggs. A long, deep, broad body with plenty of width at the hips gives internal capacity for large digestive and laying organs necessary

to maintain high production of large eggs throughout the year. A careful analysis of bird size pays later dividends in production of larger eggs.

F. Don't Overlook Resistance to Disease. Stock vitality plays a most important part in resistance to disease and ability to stand the strain of production.

Some diseases such as B. W. D. are transmitted from the stock to the chicks through the eggs. Freedom from this trouble can be insured only by purchasing from tested stock.

Certain strains of birds are more susceptible to troubles such as paralysis, big liver, tumors, etc. In purchasing stock much care should be taken in this connection if maximum income is the ultimate aim.

Sex Linked Cross — Rhode Island Red Male and Barred Rock Female.

A Good Broiler Cross.

3. HOW TO SELECT CHICKS INTENDED FOR BROILERS

The broiler industry has come into such prominence that the type of stock used is vital in determining the amount of profit made.

Chicks should be chosen that conform to the market requirements and bring the highest prices.

Vitality, fast growth, fast feathering and size are traits that the chicks must possess. An outstanding chick for this purpose can be obtained through cross breeding of large, good feathering, Barred Rock males and Rhode Island Red or New Hampshire Red Females.

At certain seasons male chicks can be purchased from the sex-linked cross. If from good stock of the above characteristics, they prove the most profitable as they grow faster and are ready for market 10 days to 2 weeks sooner than the pullets of reverse cross.

4. WHERE TO BUY GOOD STOCK

Regardless of where you buy your chicks it is well to know the production, egg size, amount of broodiness and size of eggs being incubated.

Also, when buying from a new source—check with customers who have already bought from them. Their experience and results can guide your purchases.

Baby chicks shipped over extremely long distances are apt to be damaged in transit. Overheating, chilling or going too long without food, all tend to lower the vitality of baby chicks. This cannot be corrected by any known means after the chicks have arrived.

Inferior chicks are seldom a good buy regardless of the purpose for which they are intended. The cost of a good chick is a very small proportion of the money invested in building a good pullet, yet the chick determines to the greatest degree the ultimate profit—whether it be a broiler or a layer.

Inferior chicks are usually the most expensive in the end. The difference in inheritance of chicks for layers can easily mean the difference of 40 to 50 eggs per bird per year. At 40 cents a dozen this means $1.20 to $2.00 more income per bird.

Remember a chick from inferior stock takes as much feed, care, litter, labor and fuel as a chick from good stock. Don't skimp in buying chicks, but don't pay high prices unless you know you're getting good return for your money.

5. HOW TO BROOD FALL CHICKS

The brooding of fall chicks is increasing in popularity with poultrymen desirous of maintaining uniform production of eggs during the year, as well as replacing birds due to heavy culling and mortality. It also helps to reduce the amount of work that piles up in the spring and spreads the brooding out so that it becomes a more uniform year round job.

It is well to keep the number of baby chicks started in fall brooding down to a third of the regular brooding capacity. During the last two months of maturity pullets must be raised in confinement and will need plenty of room.

Overcrowding at this age in confinement usually leads to feather-pulling, cannabalism and other vices which carry on into the laying house and cause considerable loss.

6. HOW CHICKS SHOULD LOOK ON ARRIVAL

Good quality chicks should show vitality, good size, uniformity and be active upon arrival. There should be no cripples, dead chicks, sticky down or unhealed navels. The lot should be reasonably uniform as to color, size and weight.

Usually when chicks die during the first three days after arrival the cause is, either poor stock, improper incubation, or damage in transit. If such mortality occurs, the shipper should be notified at once, not weeks later.

7. THE TIME OF YEAR TO BROOD

The time of year to brood chicks depends, to a large extent, on the number of pullets needed, amount of equipment available for brooding, and the market demands.

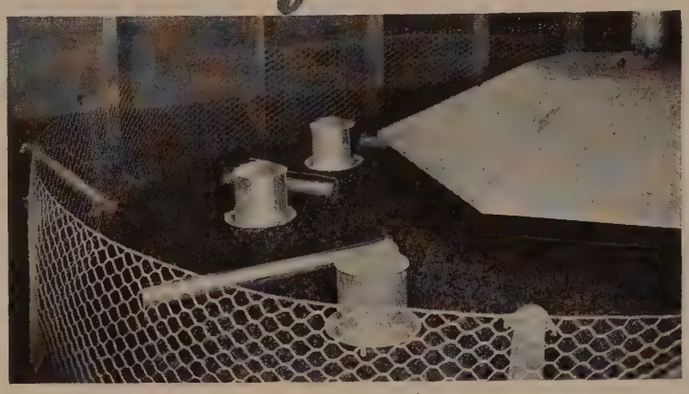
If the chicks are being raised primarily for layers and fairly uniform yearly production is essential, two lots—one in January or February and the other in April or May will usually prove most practical.

There are many advantages in raising early hatched chicks against the single disadvantage of additional fuel cost. Two lots of birds reduce the danger of overcrowding.

The advantages of two lots and early brooding are as follows:—Less overhead per pullet raised as the equipment is used twice in a season. Very little trouble from brooding diseases, such as coccidiosis. The early hatched pullets grow into large bodied birds and produce during the summer months when eggs are scarce and higher in price. These pullets, if moulted, come back and make good breeders and layers when the later raised pullets are easing off—the following spring and summer. The broilers from the early hatched chicks usually bring the highest prices of the season.

Good, Rugged Chicks.

How to Brood for Best Results



There is no one phase of poultry-keeping that requires such attention to details, as rearing the young stock up to the time the birds go out on range.

Setbacks during the first 10 weeks can seldom be corrected by any means. It is highly essential that the details outlined herein be r i g i d l y followed. All are important. Failure to follow a single one of these points will tend to lower the quality of the birds and your profits.

As stated before, management is the largest single factor upon which success or failure depends. No matter how good the stock or how good the feed, good results are impossible without good management.

Successful chick rearing starts even before the chicks arrive. Necessary procedure in preparing the brooding equipment and general management suggestions are listed here in their logical sequence.

1. CLEAN BROODER HOUSES THOROUGHLY

Brooder houses should be cleaned thoroughly after each brood has left. It is the easiest time to do it and affords several months for desirable airing.

In preparing the brooder house for the new chicks, remove all filth from the floor, walls and ceiling. A solution of one pound of lye to five gallons of hot water will simultaneously remove material sticking to the floor and kill disease germs. Start the brooder stove to dry out the pen if necessary. Next, paint floor and side walls with carbolineum, crank case oil or coal tar from a gas house. This preserves the floor, helps prevent disease growth and destroys all red mites. A good grade of disinfectant in the proportions of one pint to two-and-one-half gallons of water can be used to spray the inside of the house.

The roof should be inspected for leaks and the windows repaired if necessary.

2. PROVIDE THE PROPER BROODER STOVE

Purchase brooder stoves of sufficient capacity to accommodate the number of chicks you expect. Seldom are there less than 200 to 250 chicks in a brood and stoves with smaller than 52 inch hovers are not sufficient in either heat capacity or size to accommodate a normal size brood in cold weather.

Coal or oil stoves of the best makes are the most satisfactory type of brooding equipment for the health and comfort of the chicks.

The type of stove required will be determined by the time of year you plan to brood chicks.

COAL STOVES

Coal stoves are still the most dependable type of brooder stove for general conditions on the average poultry farm. They should be large enough to carry sufficient coal through the night. Stoves holding less than 50 pounds of coal are not recommended for winter brooding.

OIL STOVES

Great care should be taken in selecting oil stoves. The fire hazard with cheap oil stoves is tremendous. Oil stoves are very economical and afford excellent brooding conditions during warm weather because they can be turned off during the hot days and easily started when needed. They also offer the advantage of maintaining an even heat 24 hours of the day regardless of weather changes. The best types have chimneys and require a large flow of air to make the burner work. This creates an ideal condition under the stove as it draws all the foul air out of the pens through the burner and up the chimney.

ELECTRIC STOVES

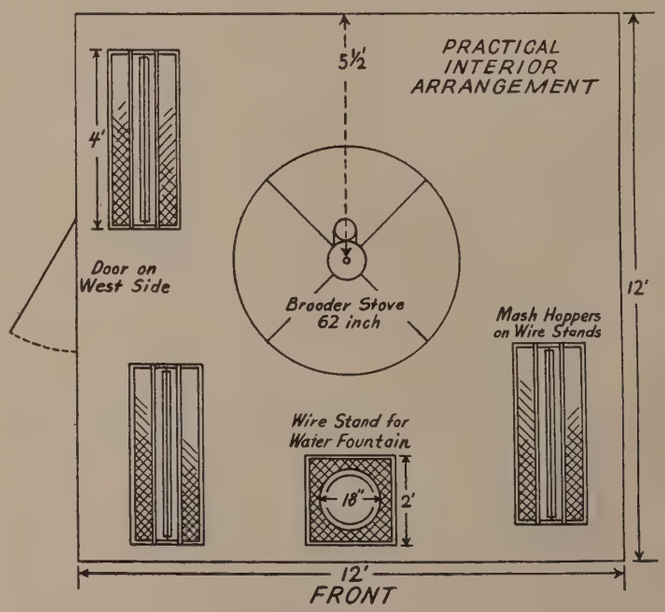
Electric stoves are not recommended for cold weather use unless sufficient auxiliary heat is available in the pen to insure dryness of litter and comfort of the chicks. This type of stove is ideal for summer brooding of both chicks and turkeys. It is economical so far as fuel costs are concerned and involves little or no labor operation.

LOCATION OF STOVE

It is usually more satisfactory to place the stove away from the center of the house. (see illustration) A 2-inch thick slab of cement for the brooder stove to stand on will reduce the fire hazard and insure proper height of the hover when using deep litter—an important factor in present day brooding.

3. KEEP A DEEP DRY LITTER

The important essential in our system of brooding is DEEP LITTER. After the stove is set, the litter should be placed in the brooder house. The cost and availability will determine the type to use. With proper ventilation and heat in the brooder house, the use of dry litter has solved the problem of coccidia control to a point where it is no longer a serious problem.

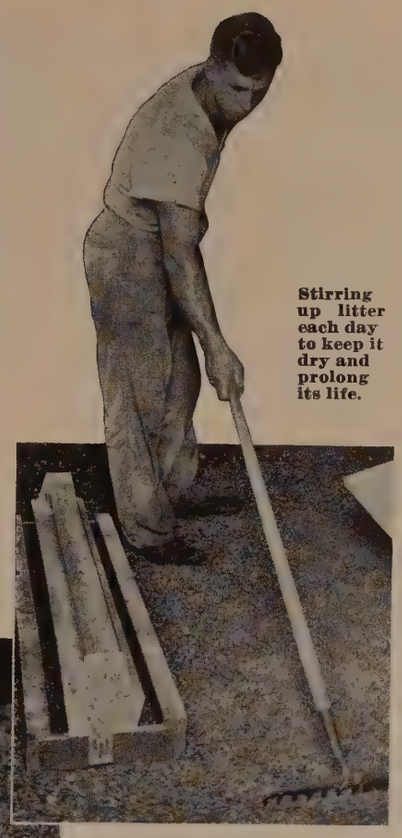


HOW TO BROOD FOR BEST RESULTS

Deep litter succeeds in controlling coccidia because it dries out the droppings before the coccidia eggs hatch. Coccidia need warmth with MOISTURE to grow.

For the first four days keep the chicks on newspapers until they learn to eat without the danger of consuming litter. Cover the litter inside the wire guard with four layers of paper at the start and each day remove the soiled top layer. At the end of four days the chicks are on the litter.

After the chicks are several weeks old, stir the litter daily with a rake or fork. The litter under the stove may be exchanged for that near the hoppers and water stand if necessary. By giving careful attention to the litter in this manner you need change it only every 6 to 10 weeks. Change only when it is impossible to keep the litter bone dry.



Stirring up litter each day to keep it dry and prolong its life.

4. PROVIDE WIRE GUARDS ABOUT BROODER STOVE

(Left) Correct depth of litter composed of peat, moss and sand.

To hold chicks near the brooder stove and at the same time allow a free circulation of fresh air provide wire guards about one inch mesh. They should be placed approximately two feet from the edge of the hover and extend completely around the stove. Allowance should be made for extension as the chicks grow older. In very cold weather, papers or cloth bags can be hung on the wire to prevent loss of heat and floor drafts. The use of solid guards such as hinged boards or heavy composition card board are very unsafe as the chicks become overheated and suffer from lack of fresh air. After five or six days the guards can be removed.

5. BUY GOOD FEED HOPPERS AND WATER FOUNTAINS

Too much emphasis cannot be placed on the importance of proper equipment for both feed and water. It is the general experience that home-made hoppers for brooding neither represent a saving in cost nor are efficient in preventing feed waste. The feed spilled from poorly designed hoppers is a menace in the spread of disease.

For best results there should be three sizes of hoppers for use in the brooder house, as shown on this page.

Keep all feeding and drinking equipment on wire stands.

6. PLACE HOPPERS AND FOUNTAINS ON WIRE STANDS

In our system of brooder house disease control, the use of wire stands for both the feed hoppers and water fountains is absolutely essential. As illustrated here, they should be made of 1 by 5 inch spruce boards set on edge and extend the length of the hoppers. Narrower boards make stands so low that they soon fill with litter and are no better than hoppers standing on the floor.

7. USE LIGHTS ONLY TO PREVENT CROWDING

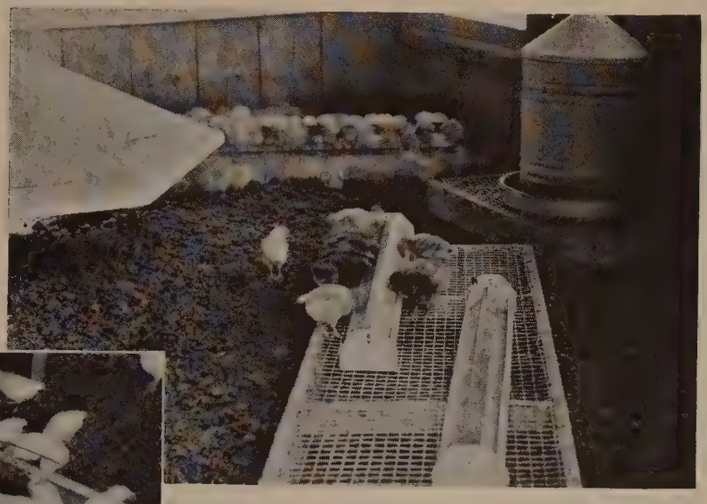
The use of lights is recommended only in preventing the crowding of chicks at night. Where used it is advisable to pick up the feed hoppers so that the chicks do not eat all night. A 7 watt bulb gives sufficient light and should be placed over the stove to prevent uneven shadows.

8. PROVIDE BROODER HOUSE YARDS

Chicks thrive better under conditions that allow them to get out into the sunshine and cool air as early as possible. Thus, yards are important. Unless colony houses are changed to new ground each year, the ground may become contaminated. Scratching sheds, wire platforms and gravel yards are used to overcome the lack of fresh ground during the brooding period.

9. DON'T OVERCROWD YOUR CHICKS

Brooding chicks in pens smaller than 10′ x 12′ is not recommended. This size house will give the best results provided not more than 250 chicks are placed under the stove. The maximum for any size stove or pen should be 300, if the birds are to be raised for future layers. In the past it has been



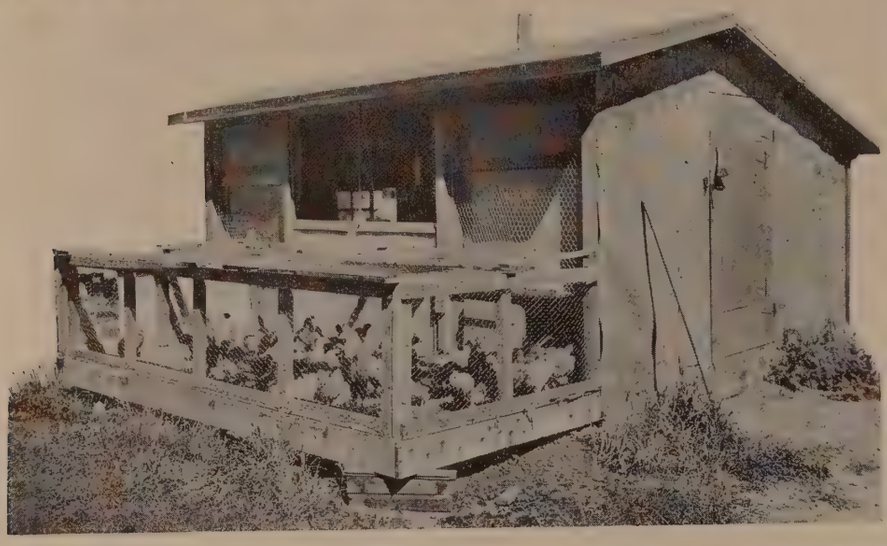
common practice for broiler raisers to run broods of 500 to 600 under a stove. The trend is gradually toward smaller units, due to the number of runts, poor uniformity in growth, disease and vices that come with overcrowding.

Poor brooding results are often blamed either on the feed or the stock when frequently they are the direct result of overcrowding.

10. WATCH THE TEMPERATURE OF BROODER HOUSES

Stoves should be started 24 hours before the chicks arrive, and the stove temperature regulated with a thermometer. The thermometer bulb should be about 2 inches from the floor and at the edge of the hover. Run the stove about 5 degrees under the desired temperature before the chicks arrive. Their body heat will raise the temperature to offset this difference. A stove temperature of 90 to 95 degrees is sufficient at the start. After the chicks have been

HOW TO BROOD FOR BEST RESULTS



placed under the brooder stove, run the temperature to suit their needs. The heat should be such that they bed down in a ring around the edge of the hover. Never run the stove so that the chicks crowd under the hover or against the stove. Avoid excessive heat. Overheating saps the vitality of the chicks. Reduce the temperature as rapidly as possible. Usually in a normal spring season it can be dropped about 5 degrees a week until it reaches 70 to 75 degrees. This drop will be slower in very cold weather and faster in late spring and summer weather.

11. CONTROL VENTILATION AND HUMIDITY

It is very essential that proper ventilation be provided to insure sufficient fresh air for the chicks, and the removal of foul air and moisture. Without proper ventilation the litter can not be kept bone dry after the chicks reach the age of four weeks.

During the first two weeks, the air is apt to be too dry for the health of the chicks. This may be remedied by either sprinkling water on the litter under the stove or placing a pan of water on the stove.

Shrivelled shanks, reduced vitality and an unthrifty appearance are the result of insufficient humidity during the first weeks of brooding. After that, the problem becomes one of too much moisture.

Ventilation can be controlled by the proper handling of curtains and ventilation slots placed at the highest part of the ceiling. These allow the hot air which is carrying the most moisture to escape.

12. SEPARATE THE SEXES EARLY

At the time when the cockerels can first be distinguished, usually around 4 to 6 weeks, they should be removed to other quarters and finished off as broilers. Those to be kept for breeders may remain. This is quite necessary for it not only gives the pullets the best chance possible to develop but is of assistance in maintaining a bone dry litter.

At this time the pullets and roosters should be made to roost. This can best be done by constructing low roosts made of frames covered with 1½ inch wire with 1″ by 2″ roosts nailed over the wire. Teach birds to roost by going out after dark with a light and driving them all up on the roosts. The wire keeps them there and after the light is out, they will stay on the roost until morning.

Poor uniformity and growth are very often the result of allowing the chicks to bed down in the corners and crowd. This condition causes overheating, sweating and loss of weight gained during the day.

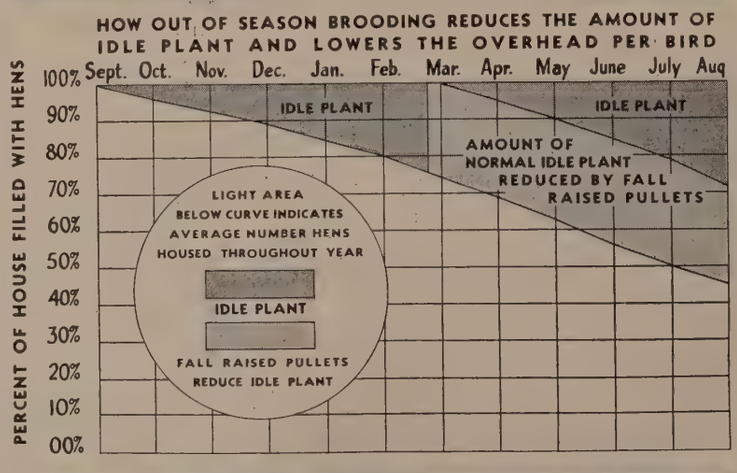
It is advisable to cull regularly. Poor chicks should be taken out of the pens as soon as noticed. They should be either killed or raised in pens with other culls to be sold for meat. Such birds are never profitable to keep for layers.

COST OF BROODING 500 BROILERS
Conn. average 1935

Chick cost 11 cents	55.00
Coal 1500 at 12.00	9.00
Litter	6.00
Feed, 10 lbs. per chick $46	115.00
Total	187.00
Overhead cost	10.00
Labor, 100 hours	30.00
	227.00
Cash cost with 10% mortality	
450 broilers at 3 lbs. cost	16.8
450 broilers at 2½ lb. cost	19.3

CHICK COST TO 11 WEEKS
Wisconsin

Chick	9.48 cents
Feed	13.38 „
Fuel	1.52 „
Total	24.38 „
Credit broilers	11.73
Pullet cost	12.65
16 pounds more feed to mature the pullets.	
Costs in percent	
Chick	34.8%
Feed	54.9%
Fuel	10.3%
Fuel costs per 100 chicks	
Coal	.0754
Oil	.0659
Electricity	.075



Teach chicks to roost early

Successful OUT OF SEASON Brooding

Out of season brooding is the rearing of chicks during the summer, fall, and early winter months.

This practice originated through the necessity for replacements in the laying house before the normal laying year had expired.

Poultrymen are recognizing the importance of keeping their laying houses full at all times. For this reason the practice of raising out of season chicks is on the increase.

The farms that have successfully raised birds out of season are turning to a system which spreads out the brooding work and lessens the rush during the spring months. Thus a more uniform yearly production is obtained.

Instead of raising all the chicks during the spring months, the usual number to be raised is divided into three or four units and started at intervals of 12 weeks.

Such a system has many advantages:

1. Brooding throughout the year makes it possible to brood with one-third less equipment.
2. It decreases overhead, for all equipment is in constant use and the laying house is kept full.
3. It simplifies the labor problem.
4. It reduces the cost of raising a pullet and increases the total income with the same equipment.
5. It provides a uniform supply of eggs throughout the year, thus making it possible to develop and hold a better market.

SOME OF THE OBSTACLES TO OVERCOME ARE:

1. Obtaining normal body weight and normal maturity of the pullets.

This is entirely a management and feeding problem, which can be corrected by maintaining normal food consumption during hot weather.

2. Getting large egg size rapidly.

Strains of birds that are bred for large egg size should be used and if proper body weight and normal maturity is obtained, small eggs should not be a problem.

3. A tendency toward increased broodiness. Again only strains of birds known to be free from broodiness should be used. With proper housing conditions and correct feeding methods, this trouble can be reduced to a negligible point.

The theory that late hatched chicks are not a profitable undertaking is erroneous. Lack of success with them is usually due to the fact that they seldom get the care and attention given to the early hatches.

To raise out of season chicks, changes in management and feeding must be made. Regardless of the time of year, desired results will not be obtained unless the chicks are comfortable; are not overcrowded, and maintain a sufficient food intake. Probably the most important management factor and the one most neglected in out of season rearing is keeping the correct, uniform temperature.

Oil or electric brooders are superior to coal for out of season brooding. Use well ventilated brooder houses with insulated ceilings. The importance of keeping the chicks cool during the hot weather cannot be over emphasized. Overheating and continued hot weather reduces the vitality, growth and ultimate size of the pullet at maturity.

Humidity must be maintained at a high level during hot weather—at least for the first four weeks. Sprinkling the litter with cold water, as often as needed, will furnish the humidity and help keep the pens cool during the hottest part of the day.

Get out of season chicks to roost as soon as possible. This is important. Building frames covered with 1½ inch wire and perches placed over the wire are the best means of getting the birds to roost. Place one edge of these frames on the floor and raise them about 10 inches where fastened at the walls. Drive the chicks up at dusk, or after dark. They will stay on the roosts all night if no light is present.

Although coccidiosis is not so much of a problem with out of season chicks, proper precautions should always be maintained.

Chicks started in the fall should be in small units, as stormy weather during the early winter months makes it impossible to range the pullets. The usual vices, such as picking and cannibalism, appear and a serious litter problem is created when they are overcrowded during cold weather.

Pullets nearing maturity and confined should have at least 2½ square feet of floor space per bird.

COCCIDIOSIS CONTROL

1. Keep a deep, bone dry litter. One inch of sand and two inches of peat make a good litter. Use other litters such as shavings or sawdust 4 to 5 inches deep.
2. Use hoppers that will not spill feed or allow chicks to scratch in the mash. Use three progressively larger sizes of hoppers from first day to the time birds leave the brooder house.
3. Erect wire platforms under all mash hoppers and water fountains. Use ¾ inch hardware cloth.
4. Stir up litter every day after the chicks are two weeks old. Exchange litter under hover for litter near front of brooder house if necessary.
5. Ventilate 24 hours a day to remove moist air. Keep brooder stove running to maintain ventilation and dry litter.
6. Use wire platforms or scratching sheds where chicks are brooded in permanent brooder houses. Use ¾ inch square hardware cloth for platforms.
7. Be sure that the water fountains are kept sanitary by thorough cleaning every day. A dirty water fountain will spread coccidiosis faster than any other means.

MONEY-MAKING *Management on the* RANGE

It is a natural tendency to feel that once the pullets are out on the range they can shift for themselves. This tendency has often been a contributing factor in the poor results experienced later in the hen house.

Pullets must come in from the range fully developed in body, well-feathered, of sufficient weight and in the pink of health if they are to hold up under high production over a long period of time. Seldom do we realize that our range conditions are not as ideal as in wild life for the development of strong sound bodies. We force the birds to produce 15 or more times the eggs they were intended to do under natural conditions. And we wonder why we have so much disease and mortality.

Mistakes in range management cannot be corrected later in the laying houses. It is highly essential that there be no let-up in careful management after the birds leave the brooder house. Lack of sound judgment here leads directly to lesser profits and often to actual loss.

Profitable Rules for Range Rearing

A well-sodded, well-drained range with high trees for shade is probably the ideal place to develop pullets. A range on a gentle southern slope will be available much earlier in the spring than one on a northern slope. Early ranges are an important profit factor today in the practice of raising early chicks.

1. SEE THAT YOUR RANGE IS WELL-SODDED

Type of soil and sub-soil are equally important contributing factors to the general health and results in raising pullets.

A sandy soil has long been advocated as ideal for a range. To retain good sod on such soil throughout the summer is extremely difficult, however. Therefore, this type of soil is actually not as ideal as one well-drained yet heavy enough to foster growth.

Low places where water accumulates after each rain, slow running brooks and swampy places unquestionably encourage the breeding of disease. They should be eliminated either by draining or fencing off.

A well-sodded range throughout the year aids materially in the health of the flock. It reduces the amount of feed needed, helps greatly in preventing feather eating and tail picking.

In a three year system of rotating yards the extra cost and bother of plowing up a range and re-seeding each year is not as satisfactory as using all the land each year. Do not overstock to an extent that kills the sod. It takes several years to build a good heavy sod and the longer a range is used the better the sod becomes.

If bare spots appear, they should be spaded up, treated with an application of lime and seeded with Dutch Clover.

It is much sounder management to raise some of the pullets each year in confinement than to overload a good range and spoil the whole flock.

Usually there are empty brooder houses or laying pens available that can be utilized to raise some of the pullets in confinement.

MONEY MAKING MANAGEMENT ON THE RANGE

2. KEEP SHELTER AREAS CLEAN

Place the shelters on the same spot each year as long as the range is used. A small area around the shelter will, of course, be bare. Accumulated droppings should be cleaned up several times during the summer. If low places develop they should be filled to prevent water from accumulating after each rain. Do not cover the area around the front of the shelters with sand or gravel. It encourages the growth of disease germs and increases the danger of infection due to the birds' natural desire for gravel. Leave the ground bare throughout the summer. This practice allows the sun to bake the filth and there is no inducement for the birds to pick around in the bare spots. At the end of each season spade and lime these places and allow to stand until the next season.

Paint the roost once each season with carbolineum to control the red mites. If allowed to breed these pests multiply in great numbers and materially sap the vitality of the growing pullets.

The number of pullets in one shelter and the adequate spacing of the shelters is important in maintaining a good sod and keeping the range free from disease.

Do not put more than 300 pullets to an acre. Spread the shelters out evenly for ideal conditions.

Clean wire stands and mash hopper stands.

3. MOVE HOPPERS AND KEEP DRINKING UTENSILS CLEAN

There are two important daily tasks on the range that should be followed faithfully:

First—move the mash hoppers a few feet each day.

Second—wash out the drinking utensils.

Move the mash hoppers a few feet each day. Starting close to the shelters and moving away daily not only helps to keep the sod in good condition but is very important in keeping down disease. No matter how well designed a hopper may be, there is always some feed spilled on the ground which becomes contaminated with droppings and soil.

Hoppers can be moved 100 to 200 feet away from the shelters and then gradually moved back again.

Above — Move feed hoppers daily

Left — Clean drinking fountains daily.

Right — Provide plenty of shade on the range.

Below — Provide fresh drinking water.

A drinking fountain is a prolific disease breeder and can be a serious source of infection to the pullets.

One of the best arrangements on the range is the installation of water floats in a small enamel pan for a drinking dish. It need only be large enough to allow the float to rest on the water and the water to drip in. Such a pan is easily cleaned.

White or yellow enamel pans are preferable as they show up dirt and readily signal their need of cleaning. When cleaning it is necessary to throw away but 2 quarts of water as compared with several gallons where refrigerator pans are used.

Allow the sun to shine on the water pans except during the hottest part of the day as an aid in keeping the drinking water free from disease germs.

Place the water pans on large wire stands with a dry well beneath. This enables excess water to be discarded in the cleaning process and, in case a valve sticks, the overflow does not soak down the ground around the drinking area.

4. MAKE PROVISION FOR ADEQUATE SHADE

The best source of shade is high trees. High shade allows a free circulation of air along the ground yet gives the relief needed from the hot rays of the sun during the middle of the day.

Low brush, high grass or rye does not provide sufficient shade.

If the range is an open field, free from any shade other than shelters, make some arrangement for the comfort of the birds. Planting 10 to 15 foot strips of corn or sunflowers helps in providing shade and is much better than portable shade frames made of bagging.

In using either corn or sunflowers, the plants should reach a height of 2 to 3 feet before the birds are allowed to range in them.

Where the summer shelters are important in furnishing shade, it is well to have the roofs painted with white paint or aluminum (heat resistant) paint. This frequently reduces the temperature in the shelters during the hottest part of the day as much as 15 degrees when compared with shelter roofs painted black.

5. RANGES WHERE GOOD SOD IS NOT AVAILABLE

Where range conditions are such that a good sod cannot be maintained from year to year it is advisable to rotate the range.

The range is usually divided into three sections and the birds moved each year. The land may be cropped for two years—the first, cultivated crops, and the second, seeded down to grass for the following year when the pullets will be back on the land. This system is more costly but overcomes the danger of contamination.

Some farms have successfully worked out a 2 yard range system due to ridge cultivation and frequent seeding of oats, rape or swiss chard while the yards are idle. Only a well drained and open soil lends itself year after year to this system. The birds are changed from one yard to the other several times throughout the summer.

6. LIMIT THE NUMBER OF PULLETS PER SHELTER

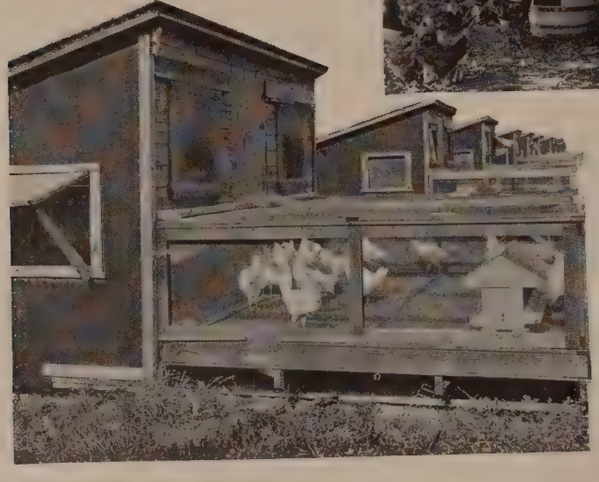
The number of pullets in one unit should not exceed 125 and fewer tend to give better results. The size of the shelter, of course, determines the maximum number. A 9 x 10 shelter should not have over 125 pullets. Smaller range shelters are becoming popular due to the ease of moving, less damage to the range and the superior results enjoyed when fewer birds are housed together.

7. ERECT PROPER FENCING ABOUT YOUR RANGE

It is advisable to fence in most ranges securely enough to keep out dogs and to keep the birds from going on the neighboring land or undesirable ground.

To make a fence satisfactorily tight use a fence stretcher and stake it down between the posts. Run a strand of four-pointed barbed wire around the outside about 4 inches away from the fence and stake tightly to the ground to discourage any animals from digging under. Another strand at the top of a five foot fence will also help protect the range.

If cockerels are to be raised on range, yard them far enough away so that they do not see the pullets. They should preferably be in smaller groups to discourage fighting. Place several old males with the young males to reduce the losses from fighting. Young roosters of widely different ages should never be yarded together.



Watertight barrels make good range nests

Confinement reared pullets on feed test

CHECK YOUR SUMMER MANAGEMENT

At the start of the season and throughout the summer, check your efficiency against the following questionnaire:

1. Did you follow the points on brooding faithfully and place good pullets out on range from the brooder houses?
2. Did you bag up the ranges for the early pullets to prevent crowding and chilling at night?
3. Were the pullets old enough and sufficiently feathered to go out without heat?
4. Are hoppers low and long enough so the birds can easily get their rations?
5. Were the drinking fountains placed near the shelters until the birds learned to locate the automatic water fountains?
6. Were all depressions that might hold rain water around the shelters filled with earth?
7. Are the mash hoppers moved each day? Are they covered and spill-proof?
8. Is the hard grain fed in hoppers and not on the ground?
9. Are the shelters overcrowded by birds migrating from their own shelter to others nearer the gate?
10. Were the birds vaccinated before they started to lay?
11. Is there plenty of shade?
12. Are the water fountains cleaned daily?
13. Was the range overstocked and all grass killed during the season?
14. Were nests provided for the pullets on range?

8. PROTECT RANGES AGAINST THIEVES

The burden of protection from stealing is up to the owner. Good dogs, a man sleeping on the range and flood lights help materially in discouraging thieves. Tattooing and the co-operation of state police have recently become important factors in reducing losses.

Although it involves extra labor, tattooing positively marks the birds beyond question. A person caught with such birds has no alibi and can easily be convicted.

If a type of range shelter is used that enables a catching coop to be fitted to the door, tattooing can be accomplished more efficiently. Birds can be vaccinated for chicken pox at the same handling.

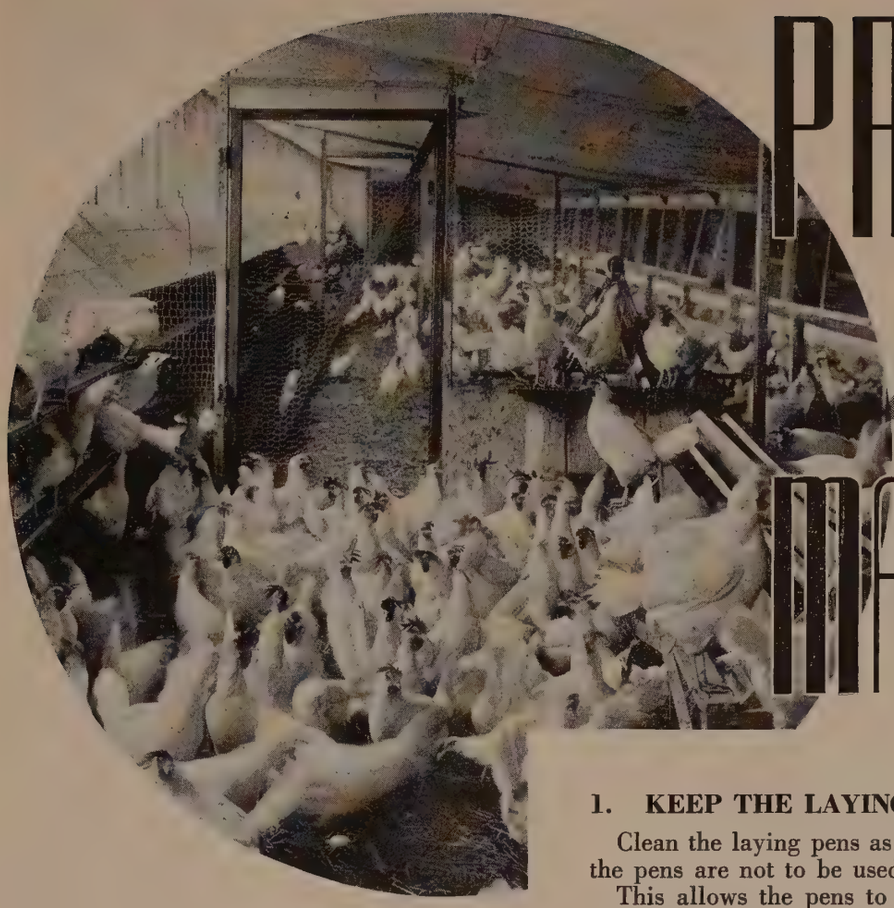
Locking the range shelters at night helps to check on thieving of small numbers. Any tampering with the locks or wire is immediate evidence of theft. This also prevents small wild animals from getting at the birds at night. Where the shelters are locked up at night, release the birds early in the morning, for birds held too long will frequently start picking.

9. FURNISH NESTS ON THE RANGES

It is important to provide suitable nests on the range. It teaches the birds to lay in nests and not on the floor later when they are housed. Pullets eggs laid in range nests will be clean and readily saleable. It lessens the danger of detrimental egg eating habits. It reduces the number of eggs lost on the range.

Nests may be made from egg boxes stacked up in tiers three high against the back of the shelters. They should be several feet off the ground. Empty water-tight barrels set on end with a large hole sawed in the side make good nests.

Pick up all eggs at least once a day. Protracted exposure to heat materially reduces their quality.



PROFITABLE *Laying House* MANAGEMENT

1. KEEP THE LAYING HOUSE CLEAN

Clean the laying pens as soon as they are vacated by the old hens, even if the pens are not to be used for some time.

This allows the pens to be thoroughly aired and gives the cleaning and disinfecting material a chance to accomplish their purpose.

Clean the pens thoroughly of all litter, manure and dust. Caked material adhering to the floor should be soaked with hot water and lye until softened. Use one pound of lye to 5 gallons of hot water.

Place all movable equipment such as dry-mash hoppers, water fountains and stands, nests and roosts out-of-doors. Wash them thoroughly and allow to stand in the sunshine until needed.

The pens and equipment should be thoroughly disinfected. (see list of disinfectants and proportions on page 14).

White washing the pens reduces the amount of electricity needed for lighting during the winter and affords better feeding conditions on dark, cloudy days. (see page 14 for white wash formula).

2. PROVIDE ROOSTING PITS

Roosting pits are becoming more popular each year. They reduce the amount of labor needed in daily cleaning and allow better ventilation and comfort for the birds. They also minimize danger of injury to birds when trying to get on or off high roosts.

Place the roosts about 18 inches from the floor and wire with 1½ inch fox wire to prevent birds from getting at the droppings. This size wire also serves to catch the eggs laid at night. Build the roosts in sections and hinge to the wall to facilitate cleaning. Place thin layer of litter on the floor after cleaning so that the droppings do not adhere.

3. BE SURE OF PROPER VENTILATION

Remodel pens that are impossible to keep dry during the cold weather by providing improved ventilation. If the moisture is not coming through the floor, or the houses built on posts so that the wind blows under the floor, such pens can be kept dry throughout the Winter by constructing what is known as slot ventilation.

This principle is shown in the plans of the Connecticut 24 x 24 foot house given in this book, and can be adapted to many types of houses. Study the directions for DRY LITTER (page 36) and follow each point as outlined.

4. RECOGNIZED PRINCIPLES OF VENTILATION

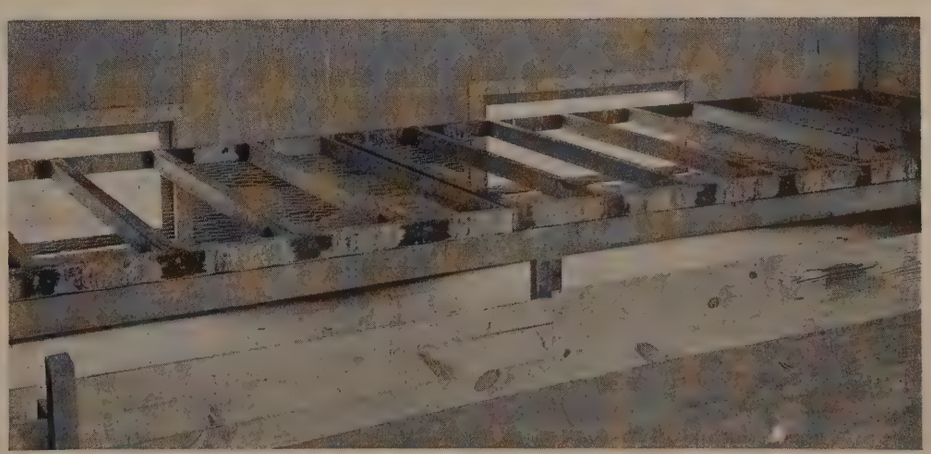
A great deal of the dampness and wet litter experienced during the cold weather has been due to the lack of INSULATION, the SHAPE of the roof and IMPROPER ADJUSTING of the WINDOWS, both day and night.

Insulation is necessary because it reduces the loss of warm air. In uninsulated houses the moisture in the air condenses on the cold ceilings and walls and either drops to the floor or is held on the boards in the form of frost.

Bear in mind that the shape of the roof plays a very important part in ventilation.

The shed roof type, when insulated, works the best, for warm air naturally works towards the highest point and can be allowed to escape at the front of the house through slots at the two corners of the pens.

Even span and two-third span houses, unless insulated and the ceiling made flat, are extremely hard to keep dry in cold



Roosting pits provide proper ventilation and comfort for the birds.

weather. They hold the warm moisture-laden air arising from the birds long enough to condense and, consequently, the moisture is not carried out of the pen with the circulation of air — no matter how much window ventilation is used.

A properly ventilated laying house.

5. HOW TO ADJUST WINDOWS FOR BEST RESULTS

Many poultrymen adjust the windows of their laying houses during cold weather in such a manner as to restrict ventilation rather than promote it.

The wrong way is to start closing the corner windows tight and work toward the middle, leaving only the center window open during the coldest nights. Such a procedure stops all exchange of inside and outside air and prevents the outward movement of warm moisture-laden air.

The proper method is to close the center window first as cold weather commences and, as it gets colder, gradually close the others. The two corner windows are the last to be closed and then never more than three-fourths. There should be an opening at the top of each corner window of at least 10 inches or more, according to the size, depth of pen, outside temperature and wind velocity. Note illustrations on this page.

Wrong window arrangement at night in cold weather. Small opening in center will not exhaust warm moist air fast enough.

Right window arrangement in cold weather. Both corner windows can be closed or opened to control intake and exhaust of air giving positive air movement.

Opening the middle windows only during the coldest weather will short circuit the pull or air flow when the corner windows only are open. Good circulation results. This method of ventilation is only necessary during the coldest months of the year.

Houses that have stationary windows in the corners, making it impossible to open them partly at the top, can have openings cut between the top of the window and the plate. These openings should be as wide as the window and at least 6 to 10 inches high. The deeper the pen, the bigger the opening should be. It is better to have a large opening and, if it is found necessary to reduce the amount of ventilation at times, a board can be made to slide on the inside to reduce the size of the opening. Placing ½ inch hardware cloth over these openings tends to baffle the air and so reduce its flow to a more even rate.

This system gives a positive circulation of air and can be worked without excessive drafts. The principle is that air entering at one corner must force air out of the other. The warm air forced out in this manner is not cooled until it is outside the laying pen. Thus, a continual flow of warm, moist air is being expelled while the cool air that enters the opposite corner is warmed and, in so doing, picks up excess moisture. For every 10 degree increase in air temperature the water-holding power of the air is increased about 100%. There is no other way to remove the moisture from the pen except to lug it out in the form of damp litter. Make the air do this job and you not only save labor and litter, but reduce mortality as well.

6. HOW TO MAINTAIN DRY LITTER WITHOUT CHANGING

Probably one of the most disagreeable conditions in the hen house, both to the poultryman and his birds, is damp litter with the necessity of frequent changes and the menace to the health of the flock.

Damp litter soils the eggs, reduces the comfort of the birds, checks fertility, increases the labor and cost of litter, and upsets the whole flock each time the pens are cleaned and new litter installed. The birds are forced to the roosts, fly all over the pen in coming down and are frequently injured.

The following suggestions have proved, in most cases, to be successful in maintaining dry litter and reducing the necessity of changing litter to only once or twice a year.

INSULATION

Without proper insulation it is almost impossible to remove the moist air fast enough to maintain dry litter. Therefore, it is necessary to insulate the ceiling, back walls and ends exposed to the outside. Partitions between pens or first floor ceiling of double-deck houses need not be insulated.

VENTILATION

Without sufficient ventilation to remove the moisture created each day in the pen, no litter can be kept dry. Highly absorbent litter, used under such conditions, only tends to hold more moisture and aggrevate an already bad condition.

New houses, or remodelled houses with slot ventilation and changes as suggested on page 20 will give the required ventilation.

WATER STANDS

The water fountain should be constructed so that all water spilled in filling, or from the birds' drinking, is caught and either passed out of the house through a drain in the floor or held in a water-tight tub or half-barrel.

Setting the water pail, pans or fountains on wire stands, or on the floor, invariably causes a wet section in the hen house

that gradually widens and finally makes it necessary to change the litter. Bone dry litter cannot be obtained if this condition is not corrected.

DROPPING BOARDS

Dropping boards should be moved out from the back wall at least four inches and kept that way all winter.

Unless this is done, it is almost impossible to get warm air to the front of the house fast enough during the coldest weather. Many houses are equipped with movable dropping boards, but the owners have placed them back to the wall in the winter, fearing a draft would be detrimental. Remember, birds in shelters and trees in the coldest fall weather are freer from colds than birds in the houses—proof that it is probably lack of sufficient air flow at night on the roosts that gives the birds fall colds in the hen houses.

OVERCROWDING

Overcrowding makes it almost impossible to keep the litter dry all winter, even if the preceding suggestions are followed. The rule of 4 square feet per bird should be followed rigidly until you have determined how efficient your ventilation is. Naturally, a mild winter makes it easier to carry more birds per pen but, as weather cannot be reliably forecast, stick to this rule.

MASH HOPPERS

Have the mash hoppers on legs. This allows the litter to be stirred up continuously by the birds scratching. Mash hoppers set on the floor soon create a hard packed area along each side which soon spreads moisture throughout the pen.

FEEDING SOME GRAIN IN THE LITTER

Feed some hard grain in the litter twice a day. This keeps the litter stirred up and allows air to get at the moisture and carry it away.

LITTER BOARDS

Place a seven inch board across the pen parallel to the front and about halfway back to the back wall. If this is done the litter will not pile up under the dropping boards and leave a bare area around the windows at the front. It is absolutely essential that the litter be kept as deep or deeper near the front of the house as it is under the dropping boards.

ROOSTING PITS

Roosting pits are a great help in maintaining dry litter by improving the ventilation conditions and encouraging the birds to spend more of their idle hours on the roosts. As a result, more of the manure is collected where it won't contaminate or wet the litter. Less litter is needed and it stays clean.

BUILD DEEP LITTER

Too much emphasis cannot be placed on this factor yet it will not solve the problem of wet litter unless all the other suggestions are rigidly carried out.

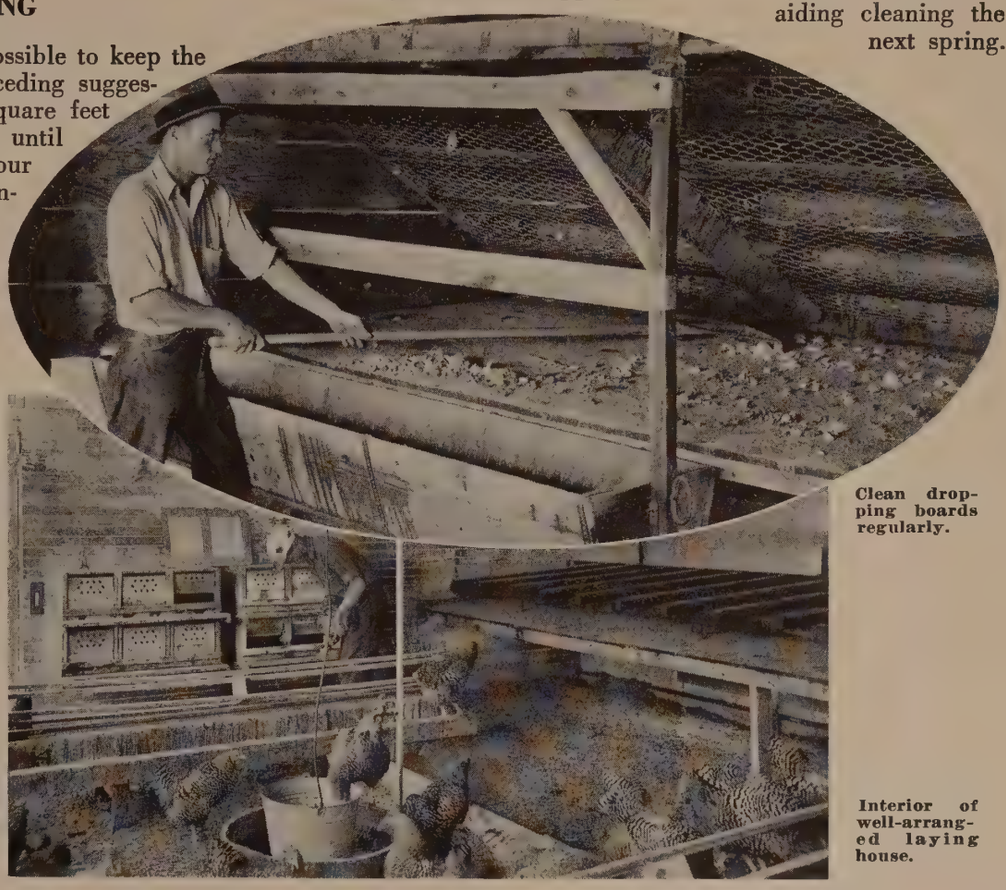
Simply throwing a lot of litter into the pen at any time of the year will not give results. A deep litter must be *built*, and built during the warm weather or late summer and early fall.

The reason for this is that litter must be worked into a fine condition before cold weather sets in.

The type of litter to choose may, in some cases, depend upon local conditions of price and type available. Practically all kinds will work if put in dry and gradually increased in depth until 5 to 7 inches of litter has been worked up before cold weather.

Wood floors built off the ground with a free circulation of air, should be boarded up on at least three sides during cold weather and a deeper litter used to prevent dampness.

The following method of building a litter has proved highly successful. First lay down an inch of coarse sand on the floor. This helps to grind up the droppings, encourages scratching and keeps any wet droppings from sticking to the floor, thus aiding cleaning the next spring.



Clean dropping boards regularly.

Interior of well-arranged laying house.

For 400 square feet of floor space spread four bales of shavings or two bales of sugar cane on the sand. Then spread 2 bales of peat moss over the shavings or sugar cane. Putting the peat on top lessens the inclination of newly housed pullets to fly around, as a dark litter scares the birds less than a light colored one.

Allow this mixture of sand, peat, shavings or sugar cane to become well stirred up for several weeks. After that strew a quarter of a bale of oat straw, free from any green grass, twice a week along the front of the pen. Place some scratch grain in the straw each day and as fast as the straw breaks up into small pieces add more until the litter becomes 5 to 7 inches deep. Never add a bale of straw at one time. It will mat down and not break up before cold weather sets in.

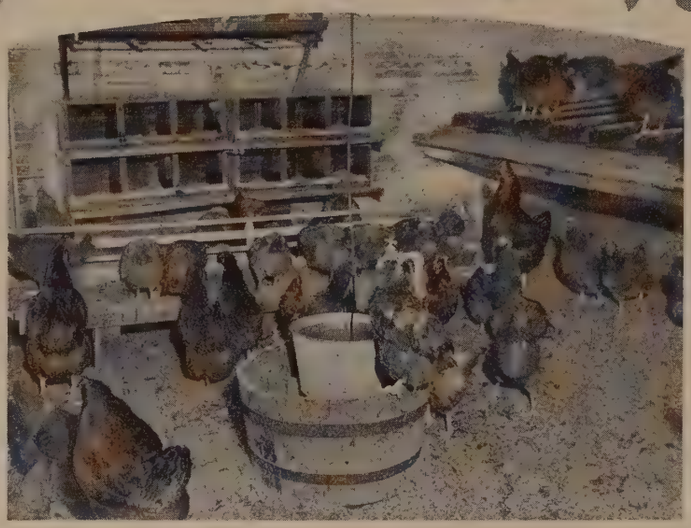
This procedure, known as building litter, can only be done successfully during warm weather. If, for any reason, it should be necessary to change in the dead of winter—do not try to build a new, deep litter. Get along with less litter and frequent changes until warm weather returns.

Be sure the litter is kept at an even depth throughout the

house. If any litter gets wet from a storm around the front of the house, remove the wet portion *at once* and replace with some old litter from the back of the house.

Be sure and feed some scratch grain in the litter every day. During long, hard cold spells, use a fork to keep the litter stirred up and porous and scatter small amounts of grain in the litter several times during the day. This can be done without extra labor when the eggs are collected. Such a practice prevents slumps in egg production due to cold weather by increasing the activity of the birds and total food consumption.

Management of Laying Stock



WHEN TO HOUSE PULLETS

Determine when to house pullets by the production, time of year and weather conditions. Usually it is best to house pullets when they reach about 25% production. House all birds of the same maturity, (size and physical condition) together. No flock of birds of the same age will start laying at the same time. Usually a small number lay well in advance of the main group. It is much better practice to raise enough pullets so that these first early-maturing pullets can be sold for meat, as they are seldom practical. After housing the pullets, keep them confined for better controlled feeding unless it is extremely hot and the hen houses are both poorly ventilated or without insulation.

As the pullets are housed, select those that are laying and allow the rest to stay on the range until production sets in, Birds left on the range will do much better than if housed with laying pullets. Pullets that are laying are very determined to get sufficient feed for themselves. If pullets are present that have not started to lay, they are often kept away from the feed and forced to roost all day.

Very late-hatched pullets will not mature before cold weather and must be housed before they start to lay. Pullets on range during the cold, stormy weather of late fall will not do as well as when housed.

If possible, catch the pullets at night in the shelters, for there is less disturbance and consequent injury to them. Much of the broken egg yolk trouble comes from rough handling or disturbances when the pullets are first starting to lay.

Do not put more than 12 birds in a crate. Exercise extreme care in placing them on the roosts in the hen houses.

If birds have to be caught during the day, use a catching coop as an aid in speed of handling and injury prevention.

HOW TO SELECT PULLETS. (See page 8)

Many farms experiencing low mortality in the hen house, plan each year to raise at least one-quarter more pullets than needed. This allows for close culling all through the growing period and as the birds are housed. It is costly to house birds not fitted for heavy production. It is much more profitable to sell them for meat than to have them die or culled after they go to pieces.

REGULATE THE SIZE OF FLOCKS

It is a recognized fact that the smaller the flock, the better the production and the lower the mortality. Yet, the extra cost of having small flocks often offsets the beneficial results.

A profitable plan is to adhere strictly to the rule of 4 square feet per bird in pens around 20 x 20 feet. Allow slightly more room in small pens and a bit less in large ones for greater efficiency per bird and ideal litter conditions.

BE PARTICULAR WITH NEWLY HOUSED PULLETS

Give extra care to the comfort of the newly housed pullets, especially from a standpoint of well ventilated pens. Excessive heat reduces food consumption, retards production and egg size and often leads to vices such as pick outs and tail picking.

During the hot days and nights of late summer and early fall keep all rear ventilation open. Close the rear ventilation only during stormy, wet weather and cold winds. Floor drafts after a warm spell may bring on fall colds.

Do not shut the front windows until it is necessary to prevent freezing in the pen. More injury is done by too much protection from the cold than too little. On windy days and nights close the windows only enough to restrict excessive drafts.

SUPPLY ADEQUATE EATING AND DRINKING UTENSILS

The first few days after the pullets are housed, have the hoppers on the floor. Then move one at a time up on the stands. Feed hard grain in the mash hoppers and in an extra trough so that all eat at one time.

Supply two 8 foot, non-waste, mash hoppers per 100 birds. Also a V trough 8 feet long for feeding wet mash and hard grain at night. This should be hung on the wall when not in use.

Provide at least one good sized water fountain for each 100 birds. Automatic fountains with running water are a big labor saver and insure a constant supply of easily reached water. Keep water available at all times for all the birds. It is essential in maintaining a high consumption of mash.

GET THE PULLETS TO ROOST

It is very important to visit the pens each night at the start and teach the pullets to roost. Birds that have been taught to roost at a very early age give little trouble.

Provide nests that birds cannot sleep in at night. The use of roosting pits eliminates practically all trouble from pullets bedding down in corners and under dropping boards. Pullets left all night in corners are very susceptible to fall colds.

Where trouble is experienced, stretch wire netting on a slant from the floor to the dropping boards and drive the birds up at dusk. Placing the birds on the roost after dark does not teach them to roost, as they do not learn how to get up themselves.

Management of Breeders

Due to the present high degree of commercialization of the poultry business, most of the baby chicks produced today come from pullet breeders. Although it is agreed that old hens of proven performance make the most desirable breeders, the tremendous demand for chicks at seasons when old hens are not in production, makes it necessary to use pullets.

It is therefore essential to see that pullets used for breeders are properly selected, managed and fed, in order that the highest quality chicks are obtained.

The best rules of management and feeding for high production of good sized eggs and shell texture should be followed rigidly.

For breeding purposes select only those pullets of the highest quality as to vitality, size and conformance to breed characteristics. Like begets like. Inferior, improperly cared for stock will produce chicks of inferior quality.

One male for every 12 to 13 females, or 6 or 8 males per 100 females yields best results in obtaining high fertility.

Great care should be given to selecting the males. The males are half the flock. All should be of good size, vigorous and masculine. Extremely bossy and fighting birds must not be allowed in pens where several males are present. One such male can cause severe interference with fertility by keeping the other males on the roost or by interfering at mating time.

Carry sufficient extra males to replace those that die or are culled during the breeding season.

If new males must be added to a pen due to death or culling, replace the surviving old ones with an entire new group. Place the old ones removed in a pen with other spare males. If no females are present, little or no trouble will be experienced with fighting. Adding one male to a depleted pen seldom works as there is too much fighting to determine who is boss.

Watch the body weight of the males closely and furnish extra feed if necessary. This can be done by placing a small box of grain high enough on the wall so that the pullets cannot reach it. In this manner males may eat whenever they desire without over-feeding hard grain to the pullets.

USE OLD BREEDERS

Only through breeding from birds that have produced one or more years, can improvement be made in production, egg size, broodiness and production of the offspring.

Buy stock from farms that use breeders in this manner to insure superior results. The extra cost of either hatching eggs or baby chicks is usually more than justified.

When the laying year is over it is very important to force pullets saved for next year's breeders into a complete moult. Do this by depriving them of all feed for one day and then feeding only hard grain until production stops. Then put the birds back on their regular feeding schedule.

Allow breeders at least 10 weeks rest before coming back into production.

PRODUCING HATCHING EGGS

The broiler industry has created a year-round demand for baby chicks. Incubation and distribution of chicks in sufficient volume have made large hatcheries necessary. The demand created by large hatcheries has provided a good year-round outlet for high quality hatching eggs. Mass production does not lend itself to best results in the production of hatching eggs. Thus, there is a big opportunity for a great number of small farms (500 to several thousand hens) to produce hatching eggs profitably.

In producing hatching eggs it must be borne in mind at all times that the eggs are to produce chicks and must hatch 70% or better! Also that chicks must have vitality, freedom from disease and of such inheritance that the ultimate buyer will be well satisfied.

A hatcher or hatchery business can prosper only to the degree of the quality of chicks it sells.

The following suggestions should be carefully followed and consulted at once if poor results are experienced.

TO PRODUCE HATCHING EGGS

1. Maintain good production and body weight.
2. Do not overcrowd. Keep litter dry.
3. Feed a ration designed for the production of hatching eggs.
4. Use 6 males to 100 hens in the heavy breeds, 5 with Leghorns.
5. Carry sufficient surplus males to maintain a full quota in each pen throughout the breeding season.
6. Give the flock full benefit of all possible sunshine and fresh air.
7. Feed extra cod liver oil during continual extreme cold or cloudy weather.
8. Feed a fleshing mash or fleshing pellets to maintain body weight if necessary.
9. Cull out all birds out of condition due to sickness or lack of vitality
10. Keep a continual supply of oyster shells and hard grit before breeders.
11. Have hoppers close enough to the floor so males cannot see across the pen and interfere when other males are mating.
12. Give males rest after used for considerable time.
13. Watch body weight of the males.
14. Do not set—or ship for hatching—poorly shelled or misshaped eggs.

PROPER CARE OF HATCHING EGGS

1. Collect eggs four times a day.
2. Always keep nesting material clean and deep.
3. Do not allow birds to sleep in nests at night.
4. Keep litter dry, which keeps eggs clean.
5. Store eggs in cool, moist place (45 to 55 degrees.)
6. Use wire baskets; do not pack eggs in boxes or cases until cool.
7. Clean eggs with steel wool.
8. Pack eggs big end up.
9. Line cases with newspaper in cold weather.
10. Before shipping or setting, candle all eggs for poor shells, cracks and meat spots.

CAUSES OF INFERTILITY AND POOR HATCHABILITY

1. Low vitality due to poor stock. Birds out of condition due to loss of weight, disease, lice or red mites.
2. Frozen combs and damp litter, due to poor ventilation.
3. Too close inbreeding.
4. Excessive use of lights, such as all night lighting.
5. Too many or too few males. One superior male interfering with the other males.
6. Improper feeds and feeding.
7. Improper care of the eggs after being layed.

ARTIFICIAL LIGHTING

Artificial lighting is considered as an indispensible practice by many. It is an important factor in maintaining proper body weight, maturing late hatched pullets, bringing breeders back into production and increasing the length of the laying period.

Lights used to maintain a 13 hour day, give the most efficient results. Changes in feeding should be made to conform with the various lighting systems. Lights are used effectively as follows:

LIGHTING PULLETS

1. Use lights on early hatched pullets that start to lay in June and July to prevent loss of body weight after they reach peak production, and if hot weather is retarding sufficient food consumption.

Mark and weigh certain pullets in each pen at regular intervals as a guide in determining when lights are necessary.

If body weight cannot be maintained by any known feeding practice, then lights should be used.

2. Lights should be used on pullets that start to lay after August first. Usually by the 15th of October lighting should be started on birds that have been in production for some time.

3. Late hatched pullets should be given a 13 hour day that they may develop at a normal rate and come into production.

LIGHTING BREEDERS

Lights are helpful in bringing moulters back into production. The use of lights is not recommended however until these birds have had sufficient rest and time to build new feathers.

HOLDING SUMMER AND FALL PRODUCTION

Birds not intended for breeders the following year may be lighted in July or later. By proper feeding they may be held in satisfactory production long after they would have naturally moulted and stopped laying. Flocks of high production birds have been held at 50% production or better for 12 to 15 months by the use of lights.

The most satisfactory system is to light the birds at 3 A. M. This gives several extra hours during the coolest part of the day when appetites are the best. Sufficient food consumption is then maintained to keep up with the required production.

MORNING AND NIGHT LIGHTS

This system gives both birds and owner a uniform day throughout the year. A 13 hour day is maintained by using lights between 5 and 6 A. M. until daylight and again just before dusk. Switch them off between 6 and 7 P. M. according to the time the lights were started in the morning.

This system requires some method of dimming the lights at night to induce the birds to go to roost before the lights are completely out. Use dimming rheostats or install a circuit which will furnish electricity to both the bright and the dim bulbs. Fifteen minutes before the birds are to roost, switch off the bright lights in favor of the dim ones. At the conclusion of a quarter hour turn them off for the night.

One dim light bulb to a pen is sufficient, as only enough light should be furnished so that the birds can just see to roost. Place it nearer to the roosts than the mash hoppers.

Discontinue the morning and night light system when the days become 13 hours long. Lights should be used on dark afternoons even though the day may have 13 hours of light.

This system is the most practical as it gives the same length of day regularly and allows the birds to be fed at the same time each day. It reduces the maximum of mash consumption as dark afternoons and short days are eliminated.

MORNING LIGHTS

This system is used where day labor is a factor, or where dairying is carried on and the day begins at 4:30 to 5 A. M. The birds are allowed to go to roost at dusk and lighted in the morning early enough to give a 13 hour day. Its one disadvantage is that dark afternoons make it impossible to have a uniform time to feed scratch grain for the night. Birds are apt not to consume enough before darkness drives them to roost. Stormy weather may shorten the day under this system as much at 2 hours. Birds are creatures of habit and do better where uniform practices of feeding are carried out day after day. Some method must be employed to furnish water with the chill removed soon after the lights go on. Also there should be some grain scattered in the litter after the birds go to roost to induce them to come down when the lights go on in the morning.

Automatic electric water heaters are probably the most satisfactory way of keeping water at the right temperature day and night. Ice cold water or frozen water pans reduce production from 10 to 20%.

EVENING LIGHTS

There are two systems of evening lights. Under the first, the birds are allowed to get up at daylight. Just before dusk in the afternoon the lights are switched on and run to 7 or 8 P. M. in order to maintain a 13 hour day. With this system it is imperative that the scratch grain feeding for the evening be held off until not over one hour before the birds go to roost. Feeding the grain one-half hour before the time the lights go off is more satisfactory, if sufficient feeding space is furnished to allow all birds an equal chance at the hard grain.

The second system is known as the night lunch system. The birds are allowed to get up and go to bed by natural daylight and are given about two-thirds the regular amount of hard grain just before they go to roost. Then the birds are lighted for one hour between 9 and 10 P. M.—given all the hard grain they will eat and forced back to roost by dimming the lights. The birds will soon get into the habit of coming down readily, filling up on grain and getting back to roost before the hour is up.

ALL NIGHT LIGHTS

This system does not give results to warrant its use where any of the other systems can be adopted. The presence of male birds in the pens results in fighting and disturbance at night that spreads through the whole house. Birds need rest to repair body tissue as well as do other hard working animals.

AMOUNT OF LIGHT

Electric lights are the most satisfactory and safest means of lighting and allow use of automatic water warmers which are essential in maintaining production in cold weather.

Pens 20′ x 20′ or smaller can be lighted satisfactorily with one 60 watt bulb, if whitewashed. Two 40 watt bulbs will remove practically all shadows at the mash hoppers and give better results than one bulb in pens 20′ x 20′ to 24′ x 24′.

Reflectors reduce the dust on bulbs and make possible the same results with smaller size bulbs.

How to FEED for Greatest Profits

The successful poultry plant is based on good stock, good management and correct feeds, fed according to a sound feeding program. The experienced poultryman knows that in a well managed flock the number of eggs a hen *can* produce is determined by inheritance — but — the number she *will* produce depends squarely upon how she is fed.

Thirty-five years ago the Park & Pollard Co. introduced the Dry Mash System of feeding. It revolutionized the poultry industry. It has been directly responsible for millions of dollars of increased profits in the pockets of the poultrymen of the United States. Since that time, Lay or Bust Feeds have been the standard by which all feeds are judged. Year after year, they have been improved through careful, scientific experimentation and innumerable field tests. Today, thousands of poultrymen throughout the East feed nothing but Lay or Bust Feeds because they provide *everything required to return the largest possible profit on the feed investment.*

Many different systems have been developed in the search for a way of feeding that will decrease labor and increase production to its maximum. Two of these systems stand out above all others as to efficiency and the ability to produce profits. They are the Three-Mash System and the One-Mash or Life-Cycle System. Both have been proved under the widest possible range of practical conditions. For each system, we offer Lay or Bust Feeds that fit the particular requirements — that produce the kind of results that mean *more money for you!*

The THREE-MASH System

The Three-Mash System provides a separate mash for the three periods of the bird's life; a chick starter fed during the first six weeks, a growing feed up to the time the birds go into the laying house, and a laying mash thereafter. In addition hard grain or P. & P. Pelleted Scratch is fed.

Park & Pollard Three-Mash feeds have been on the market for over thirty years and are nationally known for their superiority:

Park & Pollard Chick Starter
Park & Pollard Growing Feed
Lay or Bust Dry Mash

Each of these is a Lay or Bust Feed. All are packed full of the nutrients required for full and complete functioning of the birds during each of the three important periods of their development. In natural sequence they develop the birds to the maximum of their inherited capacity.

The ONE-MASH System

The Life-Cycle or One-Mash System is a more recent development but with a world of practical and successful field results behind it. In the Life-Cycle system, one mash is used throughout the life of the bird, as a Starter, a Growing Feed, and a Laying Mash. It is in fact a Starter-Grower-Layer. Do not confuse this system with the All-Mash System which requires no scratch grain, flexibility being accomplished through the use of pellets.

Scratch grain or Pelleted Scratch supplement the Life-Cycle Mash as directed.

Park & Pollard Manamar "Life-Cycle" Mash is a Lay or Bust Feed sold in large tonnage throughout the Eastern States. It has built its enviable reputation on results in terms of flock health and money profits. It contains the ingredient, Manamar, which is a product derived entirely from sea life and carries vitamins, proteins and minerals in unusual amounts and of unusual quality. Rations containing Manamar are mineral-complete rations. The result is improved health, vigor and production which, in turn, means increased profits.

How much MORE is a GOOD Feed Worth!

1. A GOOD FEED WILL SAVE ON THE FEED BILL BECAUSE LESS FEED IS REQUIRED

Example:			
IF, INSTEAD OF 9 LBS. OF FEED TO PRODUCE A 2 LB. BROILER, IT REQUIRED BUT	LBS. 8	LBS. 7	LBS. 6
WITH BROILER FEED AT $55 A TON, THE EXTRA PROFIT PER TON OF FEED WILL BE APPROX.	$6.15	$12.25	$18.35

2. A GOOD FEED WILL INCREASE THE INCOME PER TON OF FEED

Example A:				
IF FEED INCREASES WEIGHT PER BROILER . . .	OZ. 2	OZ. 4	OZ. 6	OZ. 8
WITH BROILERS AT .25 PER LB., THE INCREASED PROFIT PER TON OF FEED WILL BE	$10.50	$20.75	$31.25	$41.50

Example B:					
IF FEED INCREASES NO. OF EGGS PER YEAR PER HEN BY	6 EGGS	12 EGGS	18 EGGS	24 EGGS	30 EGGS
WITH EGGS AT .30 PER DOZ. THE INCREASED PROFIT PER TON OF FEED WILL BE	$7.50	$15.00	$22.50	$30.00	$37.50

3. A GOOD FEED WILL INCREASE INCOME PER TON OF FEED THROUGH DECREASED MORTALITY

Example:					
IF FEED DECREASES MORTALITY UP TO 10-12 WEEKS BY	2%	4%	6%	8%	10%
USING AS VALUE OF THE BIRD AT THAT TIME 25c PER LB. THE VALUE OF THE FEED PER TON IS INCREASED BY	$3.34	$6.68	$10.02	$13.36	$16.70

How to Feed PARK and POLLARD Chick Starter

Before the chicks are placed around the hover, put P & P Chick Starter on the newspapers that cover the litter. Place the mash in small piles ¼ to ½ inch deep, or feed it on paper plates for the first three days. Do not use cup plates from *used* egg cases as they may introduce B.W.D. infections.

Fill small, metal mash hoppers with P & P Starter so that the chicks learn to eat from them as soon as possible. Furnish plenty of drinking fountain space the first week. One small fountain to every 75 chicks is desirable. Lack of sufficient water fountains is often responsible for first week mortality and uneven growth. Use only LUKE-WARM WATER the first week, especially in cold weather.

Supply sufficient hopper space. A safe guide is to furnish one inch of hopper space for every chick. Insufficient hopper space often results in poor growth, runts, barebacks, picking and litter eating. After the fourth day, place the hoppers on wire stands, to prevent the chicks from eating spilled food off the floor. Wire stands reduce the danger of coccidiosis infection.

Replace the small mash hoppers after 3 to 4 weeks with larger ones and increase the number. This furnishes the necessary extra feeding space needed by growing chicks, eliminates the labor involved in frequent filling of small hoppers and reduces the amount of feed spilled by the chicks.

Arrange the hoppers as shown on Page 28 for convenience in filling and also to provide a place for the chicks to gather when the attendant enters the house to feed, attend the stove or adjust the window.

SCRATCH GRAIN FEEDING WITH P & P CHICK STARTER

P & P Chick Scratch need not be fed until the chicks are 4 weeks old. Then feed only small amounts once a day until the chicks are 6 weeks old. A half pint to one pint of grain per 100 chicks fed in the late afternoon allows them to go to bed with full crops and develops the habit of filling their crops for the night.

Some poultrymen feel that the feeding of chick scratch from the start is beneficial in building strong, digestive tracts and in creating resistance to coccidiosis. If this practice is followed, small amounts of P & P Chick Scratch are fed several times a day. The total amount for each day should not exceed ½ pint per 100 chicks until the birds are five weeks old.

Substitute P & P Intermediate Scratch Grain for Chick Scratch at the end of the fifth week. Either feed the birds all they will clean up just before dark or hopper feed the grain in separate hoppers. When hopper feeding Scratch Grain be sure not to over-fill the hoppers. It is preferable to have the chicks clean up all the grain before more Scratch Grain is placed in the hoppers.

At the end of six weeks, chicks intended for layers should gradually be shifted from P & P Chick Starter to P & P Growing Feed. See Page 45.

GRIT

The efficiency of the ration is increased when the birds have grit. Supply chick size hard grit from the first week on. See page 48.

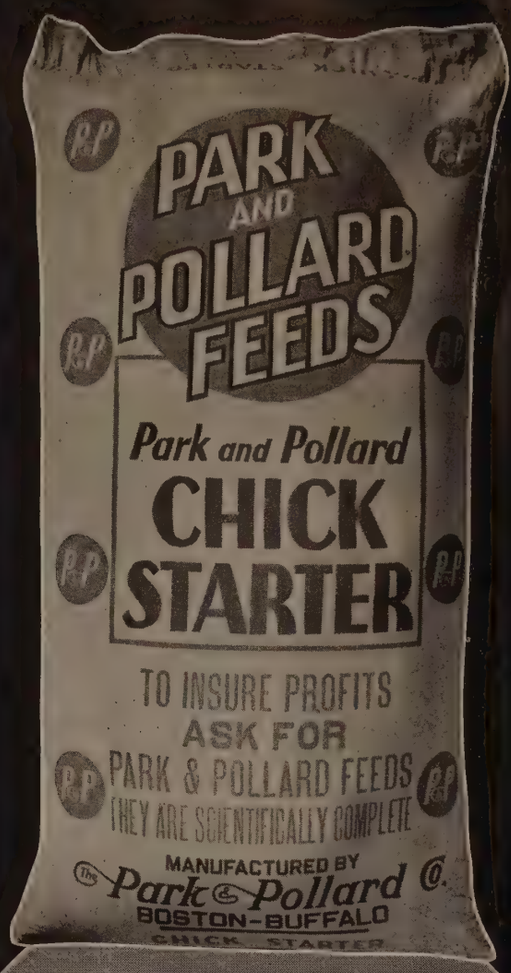
COCKERELS

Separate the cockerels by the sixth week and place them in separate quarters. They should then be gradually changed to P & P Starter and Broiler Mash and be fed as directed on page 44.

Cockerels saved for breeding purposes should be fed the same as the pullets.

Picking and cannibalism are often caused by overcrowded conditions, too much heat and excessive feeding of hard grain. Some strains of birds have a greater tendency toward such vices. Slow feathering birds should be watched carefully for picking.

It is not necessary to feed green feed with P & P Chick Starter. It contains dehydrated Alfalfa leaf meal and all essential vitamins and minerals.



PARK and POLLARD
CHICK STARTER

A LAY OR BUST FEED

Park & Pollard Chick Starter provides for rapid growth, full development of bone, muscle and tissue, high vitality and resistance to disease. It further results in excellent pigmentation and low mortality—all at low feed cost per pullet housed. No starter can do more. Compare results!

How to Feed PARK and POLLARD Starter and Broiler Mash

If the baby chicks are purchased, place them around the brooder stove as soon as they arrive. If you are hatching your own chicks, allow them to harden off 24 hours after removing from the incubator. Furnish them with lukewarm drinking water in small fountains. One fountain to each 75 chicks. Lack of sufficient water fountains is often responsible for first week mortality and uneven growth. Sprinkle Park & Pollard Starter and Broiler Mash on the newspapers covering the litter or feed on paper plates for the first 3 days. Also, fill small chick hoppers with mash and place around the hover so that the chicks may learn to eat from them as soon as possible. Hoppers should be of a type that does not permit waste of mash.

At the end of four days remove the last newspapers covering the litter and place hoppers on wire stands. See that the chicks can get on the wire stands and are eating from the hoppers.

Insufficient hopper space often results in poor growth, runts, bare backs, picking and litter eating. A safe guide is to furnish 1 inch of hopper space for every chick. At four weeks increase the number of hoppers and change to a larger size.

PRODUCING BROILERS WITH P & P STARTER AND BROILER MASH

Chicks raised entirely for broilers should receive the same general care and management as outlined for laying stock. Probably more care should be given the chicks during the first three days as broiler raisers frequently brood in units of 300 to 400 chicks at a time. The general tendency is to brood in too large units and, unless care is taken that the birds have plenty of water fountains and feeding space, poor growth, runts and high mortality are bound to result.

Feed chicks P & P Starter and Broiler Mash in hoppers on wire stands and increase the size and number of hoppers as the chicks grow. The rule of one inch per chick, doubled after four weeks, provides sufficient feeding space.

It is very good practice to allow the chicks to clean up the hoppers at least once a day before providing fresh feed. This practice keeps the birds' appetites keen and avoids going off their feed as they grow older. It is imperative that there be plenty of feeding space so all chicks can eat at once if such a system of feeding is carried out. Supply plenty of fresh clean water at all times. Never allow the water fountains to go dry. It leads to trouble and reduces feed consumption.

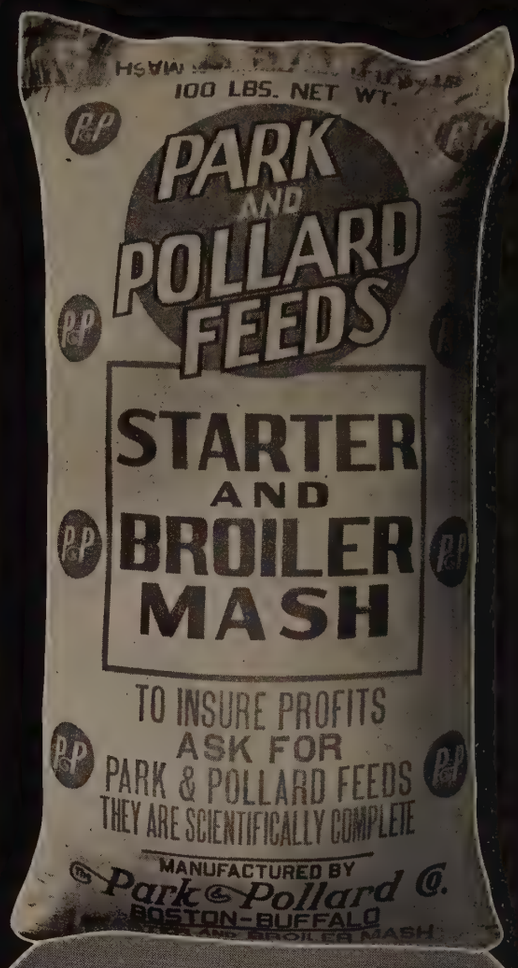
Feed no Scratch Grain to birds intended for broilers. On the 8th to 9th week shift the birds gradually from P & P Starter and Broiler Mash to P & P Broiler Finishing Mash, and feed nothing else until marketed. From the 8th week feed fresh mash three or four times a day, but do not provide a fresh supply until the old is entirely consumed. This keeps the birds on the feed and assures maximum growth.

Birds that go off their feed should be flushed at once with a dose of epsom salts at the rate of a pound to 4 gallons of water for one-half day only.

To prevent poor growth, birds being raised for broilers should have sufficient room as they grow and should be made to roost as soon as possible. Broilers, allowed to crowd on the floor at night, sweat off some of the weight gained each day. The result is uneven growth and runts. Uneven growth is either the result of poor stock, poor incubation or poor management. The rate of growth is determined by the type of stock, management and feed. Uneven growth is seldom caused by the feed used when nothing but mash is fed and plenty of hopper space is furnished. Feed hard grit in the mash hoppers in small amounts from the first week.

LIGHTS

Where large numbers of chicks are placed under a stove, the use of dim lights at night prevents crowding. During the first four weeks the hoppers should be emptied at night or picked up off the floor when night lights are used. Excessive mash consumption may result in nutritional paralysis due to too rapid growth.



PARK and POLLARD
STARTER AND BROILER MASH
A LAY OR BUST FEED

Park & Pollard Starter & Broiler Mash is built for rapid but complete growth. Brings the broilers to high market condition in shortest possible time. P & P fed broilers are fully feathered with excellent shank and skin color. The most popular feed among commercial broiler producers.

How to Feed PARK and POLLARD Growing Feed

At the end of six weeks chicks intended for layers should be gradually shifted from P & P Starter to P & P Growing Feed and P & P Intermediate Scratch Grain.

Just before this change is made, separate the cockerels and place in another pen. Feed them as indicated on Page 44.

Chicks do best if changes in feed are not too rapid. A week to 10 days should be taken to complete the change to P & P Growing Feed. Sufficient hopper space should be furnished. Better growth and appetites are maintained if the birds in the brooder house are allowed to clean the hoppers several times a day before getting fresh mash. Replace Intermediate Scratch Grain with P & P Scratch Grain or P & P Pelleted Scratch at 9 to 10 weeks.

Place the pullets on range as soon as weather permits after they are 8 weeks old.

Increase the amount of Scratch Grains or Pelleted Scratch as the birds grow older. By 12 weeks, the proportion of Scratch to mash should not exceed 50-50 for birds hatched in March or April. Birds hatched during the winter months can stand more Scratch Grain or Pelleted Scratch feeding. Birds hatched in May and June or during the summer months should receive considerably less. Overfeeding Scratch retards growth and maturity to some degree. Keep P & P Growing Feed before the pullets at all times but be sure the birds on range clean the mash up once a day. Feed fresh mash each day at the same time the Scratch is fed.

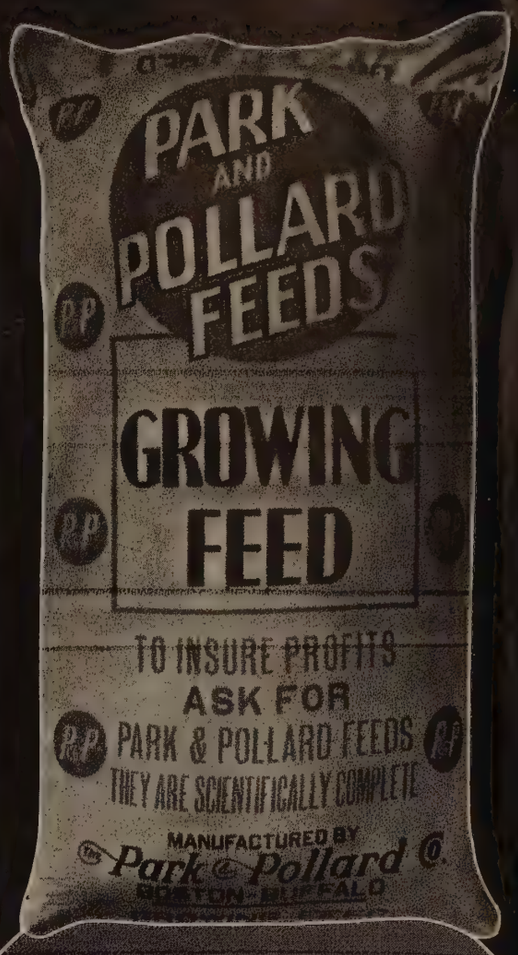
A very satisfactory way to feed P & P Pelleted Scratch or Scratch Grain to pullets is to feed all they will clean up in the late afternoon with enough left over to last until the following noon. Vary the amount each day according to that left over from the day before. During hot spells the birds will eat less Scratch and considerably more when the nights are cool. Allowances should be made for such conditions.

This system allows the birds to balance the proportions of Scratch to mash as needed and reduces the tendency to select the grain they like the best and leave the rest. If labor is a factor P & P Pelleted Scratch or Scratch Grain sufficient for several days needs can be fed in hoppers. Make sure that hoppers are spill proof and protected from rains. Where ranges are large and clean the Scratch can be hand fed each day. Feed allowed to accumulate on the ground will become mouldy if wet and cause serious digestive troubles.

Hard Grit should be furnished to growing pullets.

Pullets usually require but little oyster shell until they commence to lay. When the pullets begin to lay, check the supply of oyster shell on range.

P & P Growing Feed should be fed until the pullets have reached 20% to 25% production. Then replace it gradually with Lay or Bust Dry Mash. The birds should be on Lay or Bust 100% by the time they reach 50% production.



PARK and POLLARD GROWING FEED

A LAY OR BUST FEED

Park & Pollard Growing Feed follows P&P Chick Starter and continues the job of providing every essential for normal and complete development. Full of the needed minerals, proteins and vitamins. Does everything a feed can do to fill the laying house with healthy, vigorous, profit-making pullets.

How to Feed LAY OR BUST Dry Mash

When the pullets have reached 20 to 25 percent production, gradually change from P & P Growing Feed to Lay or Bust or P & P Breeder Mash.

Pullets kept on growing mash too long after production has commenced often lose flesh due to the lack of protein necessary to maintain egg production.

It is very important that sufficient hopper space and hoppers of the proper type be furnished. High egg production and the maintenance of good body weight cannot be obtained without correspondingly high mash consumption.

For 100 pullets furnish two eight-foot mash hoppers or thirty-two feet of feeding space. Use hoppers from which the mash cannot be "billed out" by the birds, not so deep that the birds have difficulty in reaching the bottom of the hopper. Hoppers should be off the floor to keep the litter out of the mash. Have the mash hoppers high enough off the floor so that litter is not scratched into the hopper but not high enough so that the birds can get under them. This makes it easier for the birds to get mash and also is a great aid in obtaining high fertility in breeding pens. Hoppers that are fairly low make it difficult for males to interfere with each other when mating. For the first few days place the mash hoppers on the floor so that the pullets may learn to eat more readily from them. The hoppers should be put up on stands one at a time.

Feed as much fresh laying mash daily as the birds will clean up in 24 hours. This increases mash consumption and is a necessary practice at certain seasons of the year when it is difficult to maintain production.

When fresh mash is added to the hoppers push the old mash down to one end of the hopper or mix it with the fresh mash.

P & P PELLETED SCRATCH OR SCRATCH GRAIN FEEDING WITH LAY OR BUST

Remember that pullets coming from the range to the laying house undergo a radical change in their daily life. Confinement is apt to make pullets restless. The lack of green feed reduces bulky feed that the birds are getting. Both of these conditions are contributing factors in outbreaks of picking and cannibalism.

When first housed, pullets should continue to receive about as much Scratch Grain or P & P Pelleted Scratch as they were consuming on the range. As production increases, increase the mash consumption. The feeding of excessive amounts of scratch as the birds come up in production interferes with the necessary mash consumption. Such a condition usually is responsible for outbreaks of pickouts, feather pulling, picking or cannibalism.

Feed P & P Pelleted Scratch or Scratch Grain in hoppers or on top of the mash until the birds become accustomed to scratching in the litter.

There are three methods of feeding Pelleted Scratch or Scratch Grain, as follows:

1. HAND FEEDING IN TROUGHS

This system is by far the best for poultrymen who hand feed Scratch. Give birds all the Scratch Grain or P & P Pelleted Scratch they will clean up before going to roost. Spread three-fourths of the scratch on top of the mash and in an extra V trough so that all the birds can eat at once. Feed the rest in the litter so that the birds get some exercise and so that the litter is continually stirred up.

Feeding Scratch in this manner, instead of all in the litter, makes it much easier to determine the amount the birds leave, and thus governs the amount to be fed the next night. Feed from one to two quarts of Scratch Grain or Pelleted Scratch per 100 birds the first thing in the morning. This can be scattered in the litter. Where early morning lights are used, the scratch can be scattered in the litter the night before after the lights are out and the birds are on roost.

2. HAND FEEDING IN THE LITTER

The feeding of all the Scratch (Grain or Pellets) in the litter is not recommended.

This system often leads to over feeding of Scratch because of the difficulty in determining how much the birds leave. The Scratch must be fed earlier in the

PARK and POLLARD

DRY MASH

A LAY OR BUST FEED

Park & Pollard Lay or Bust is the original Dry Mash. Has returned profits to the poultrymen of the Eastern States for over 35 years. Today, better than ever, it contains all the mineral, protein and vitamin elements needed for maximum health—high production and increased profits.

afternoon with this system to allow the birds sufficient time to find it.

3. HOPPER FEEDING

Although it saves labor to keep P & P Pelleted Scratch or Scratch Grain before the birds at all times and allows them to balance their own intake of mash to scratch, this method does not give satisfactory results. The birds are liable to get too fat and show such vices as picking and cannibalism.

WATCH BODY WEIGHT

The most important factor in handling laying pullets, especially early laying pullets is maintaining normal body weight. Unless the pullets gain weight slightly as they increase in production, high production cannot be obtained. Birds should gain slightly until they are at least ten or eleven months old.

When housing the pullets it is well worth the trouble to sort the pullets into two groups. House the pullets with good weight together and keep the lighter weight pullets separate. Then feed each group of birds according to their needs. Leg band ten pullets in each pen, weigh them and record their weights every ten days to two weeks.

Increase the scratch for pullets that fail to gain, but not to a point where it interferes with normal mash consumption. If Scratch Grains or P & P Pelleted Scratch fail to increase the weight use the following system.

Pullets that do not respond to increased scratch feeding should be fed P & P Fleshing Pellets at the rate of 2 to 4 quarts a day per 100 birds preferably at noon. See Page 48 (Fleshing Pellets).

If the birds have not been on P & P Pelleted Scratch and, therefore, do not take to P & P Fleshing Pellets at first, moisten them slightly with water or skim milk for a day or so. Once the pullets become accustomed to pellets, they will relish them and be looking for them at feeding time. The amount of P & P Fleshing Pellets should be increased or decreased according to the body weight of the pullets. They replace wet mash entirely.

During the coldest weather take extra care that the birds maintain a high intake of both mash and scratch. The cold may make the birds uncomfortable and tend to reduce the amount of food consumed. It is possible to overcome this by feeding a small amount of P & P Pelleted Scratch or Grain in the litter several times a day. Feeding fresh mash twice a day also helps increase mash consumption. Feed 2 to 4 quarts of the Fleshing Pellets per 100 birds at noon as mentioned. Maintain the drinking water at 40 to 50 degrees to encourage its consumption. Water is essential to production.

When to Feed PARK *and* POLLARD BREEDER MASH

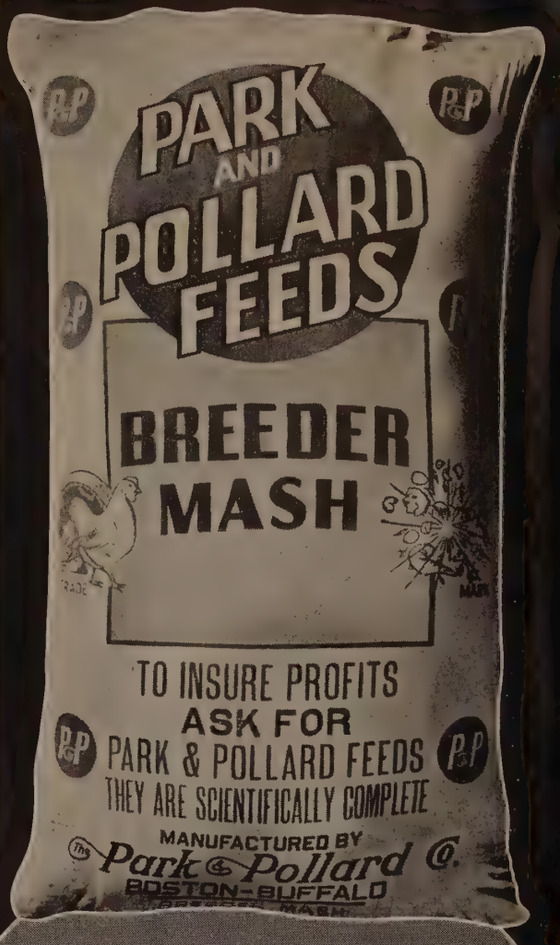
Lay or Bust Dry Mash is an excellent Breeder Mash. Some poultrymen, however, prefer a higher protein feed for their breeders. Park and Pollard Breeder Mash is designed to meet this demand. P & P Breeder Mash is fed to old breeders while moulting and through the laying period when the eggs are being used for hatching.

Feed Breeder Mash with P & P Pelleted Scratch or Scratch Grain and P & P Fleshing Pellets in the same manner as with Lay or Bust. Slightly more Scratch can be fed with P & P Breeder Mash than with Lay or Bust.

How to Hold SUMMER EGG PRODUCTION

As warm weather approaches reduce slightly the amount of P & P Pelleted Scratch or Scratch Grain and concentrate on increased mash consumption. Hot weather reduces the desire to eat and it is natural for the birds to fall off in production. Feed fresh mash each morning as early as possible and 2 to 5 quarts of Fleshing Pellets per 100 birds at noon. Limit the feeding of Scratch to about half the amount of mash eaten and feed as late in the day as possible. During the summer feed the Scratch in the evening.

See that the birds have plenty of fresh cool drinking water and that the laying pens are as cool as possible. When production drops below 50% lengthen the day with lights. See Page 40. This will hold birds in good production well into the fall.



PARK *and* POLLARD

BREEDER MASH

A LAY OR BUST FEED

Park & Pollard Breeder Mash is a distinct contribution to high vitality and low mortality in the breeding flock. It results in maximum production of large sized eggs—strong shelled eggs of best quality—high fertility and hatchability and increased profits to the breeder.

How to Feed PARK and POLLARD Fleshing Pellets

In the past the practice of wet mash feeding has been necessary at times in order to increase the intake of total food. Park and Pollard Fleshing Pellets now do away entirely with the labor and fuss of wet mash feeding and still produce the same, if not better, results.

Compressing the ration into pellets has proven to be the most efficient means of inducing a great intake of food in a short period of time. It eliminates the labor and inconvenience inherent in wet mashing.

P & P Fleshing Pellets are used to advantage in the following manner:

HOLDING BODY WEIGHT

When pullets are coming into production rapidly and have reached 50% production, feed P & P Fleshing Pellets at the rate of 2 to 5 quarts per 100 birds. Determine the amount by the body weight of the birds. Spread out pellets on the mash and place some in the V trough used for hard grain or Pelleted Scratch feeding. It is not advisable to scatter the pellets in the litter, unless there is not sufficient hopper space to allow all the birds to eat at once.

When it is necessary to stop feeding P & P Fleshing Pellets do so by gradually reducing the amount.

COLD WEATHER

During extreme cold spells the feeding of P & P Fleshing Pellets may be necessary to maintain sufficient food intake for high production.

LATE HATCHED PULLETS

Pullets that are late hatched or hatched out of season can be fed P & P Fleshing Pellets if the weight is not satisfactory or the birds are slow in coming into production.

FATTENING COCKERELS AND FOWL

The feeding of P & P Fleshing Pellets to cockerels is a great aid in putting on flesh rapidly. It is usually difficult to get cockerels to eat sufficient mash but feeding pellets overcomes this condition, for they relish them even more than they do hard grain.

Fowls are apt to be slightly thin on the breast and fat behind after a long period of production. The use of fleshing pellets instead of scratch grain is the most rapid method of getting such birds into marketable condition.

PULLETS ON RANGE

Feed P & P Fleshing Pellets to pullets that are coming into maturity without sufficient weight. Feed pellets once a day, preferably in the morning before the sun gets so hot that the birds retire to the shade for the day.

POULTRY NEED GRIT FROM HATCH TO HATCHET

There are different kinds of grit. Limestone, Granite and Mica are probably the most common. We recommend the use of a hard insoluble grit. Keep it before the chicks, pullets and hens at all times in a regular feed hopper —the same as is used for the mash.

For chicks it may not be necessary to mix grit in the mash for longer than a week of two after it is put before them in troughs. As soon as the caretaker of the chicks is sure that they are eating it readily from the trough, mixing it in the mash may be discontinued.

Feed grit according to size:

No. 4 size grit is baby chick grit.
No. 3½ size grit is part baby chick grit and part intermediate size.
No. 3 size grit is intermediate size.
No. 2 size grit is large — or hen size.

The size of the grit fed should be changed as soon as birds will eat the next larger size.

PARK and POLLARD

FLESHING PELLETS

A LAY OR BUST FEED

Park & Pollard Fleshing Pellets are a balanced, pelleted fleshing mash that eliminates the labor and bother of wet mashing. Increases feed consumption, holds production at high levels, keeps the flock in good body condition. Completely balanced as to proteins, vitamins and minerals, it is also used in finishing fowl or cockerels for market. An ideal supplement to Lay or Bust or Life Cycle Mash.

How to Feed PARK and POLLARD Life Cycle Mash

Life Cycle Mash is a mash ration to be fed with P & P Pelleted Scratch or Scratch Grain at various levels and used through the bird's entire life. The amount of scratch is determined by the age of the birds, time of year, production and body weight.

LIFE CYCLE FOR BABY CHICKS

The same general preparations should be made before the chicks arrive as outlined on Page 44 under the feeding directions for P & P Starter and Broiler ration. Place Life Cycle Ration in small piles on the newspaper covering the litter or on paper plates. Also place small hoppers filled with Life Cycle Mash inside the brooder ring from the first day on. It is very essential that there be plenty of drinking fountains and that the chicks learn to drink at once.

After the fourth day remove the newspapers and place small hoppers on wire platforms. There should be at least one four-foot mash hopper to every 100 chicks or the equivalent feeding space in smaller hoppers. Metal hoppers with reels are far more satisfactory and no more expensive than home made wooden ones.

How to Feed Scratch with LIFE CYCLE MASH

Until the chicks are 6 to 8 weeks old no Scratch Grain should be fed with Life Cycle Mash.

Usually at this time the cockerels are removed from the pullets. At 8 weeks they are gradually changed over to P & P Starter & Broiler Ration and are pushed to market size as soon as possible.

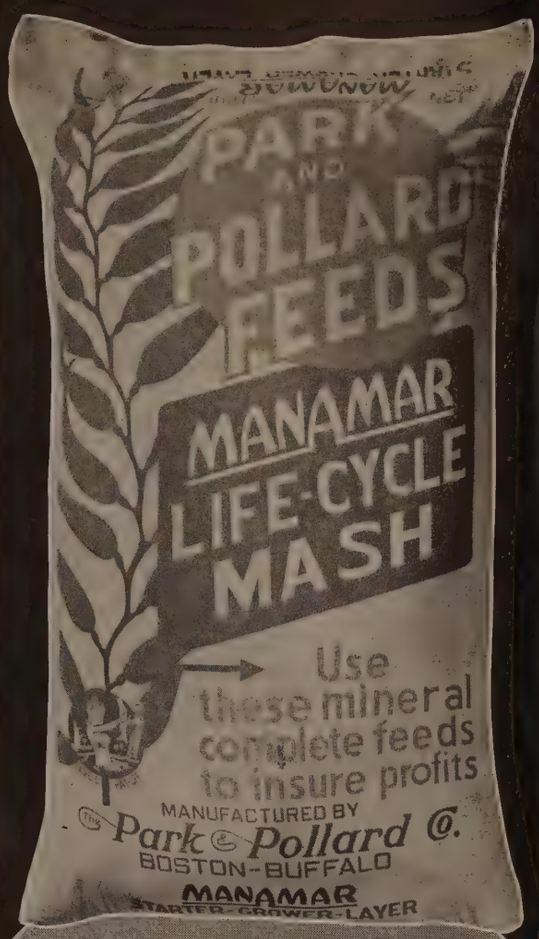
Continue the pullets on Life Cycle Mash and begin feeding a small amount of P & P Intermediate Scratch Grain at the 7th or 8th week.

It is advisable to feed only what Intermediate Scratch Grain the pullets will readily clean up in the late afternoon. The amount of scratch grain fed governs the rate of growth. Excessive amounts should not be fed at this age.

From the 9th week on, P & P Pelleted Scratch or hen-size Scratch Grain should be used and the amount gradually increased as the birds mature. Under normal conditions the pullets should not receive equal parts of scratch and mash until about the 14th week. Very early hatched pullets should receive more scratch to prevent too rapid maturity. Very late hatched and summer chicks should receive very little scratch until they are 12 weeks old in order that a normal rate of growth may be obtained. Summer heat retards food intake and also lessens the amount of scratch that should be fed to chicks during the first twelve weeks.

Place pullets out on range as soon as weather permits after the chicks are 8 weeks old. Cool shelters and shady ranges are necessary if uniform, heavy, well matured pullets are to be raised.

Plenty of mash hoppers are essential and a continuous supply of fresh drinking water should be furnished. Move the mash hoppers several times a week to prevent ground contamination.



PARK and POLLARD

LIFE CYCLE MASH

A LAY OR BUST FEED

Park & Pollard Life Cycle Mash with Manamar is a Starter-Grower-Layer. Life Cycle and the one mash system of feeding has been uniformly successful since first introduced several years ago. Contains everything needed at all periods of the bird's life. Simplifies the feeding problem. Outstanding in terms of results.

Feeding Park and Pollard PELLETED SCRATCH or GRAIN on the Range

There are several systems of feeding Scratch to pullets out on the range, when Life Cycle is used as a growing feed.

1. Feed P & P Pelleted Scratch or Scratch Grain every afternoon in extra troughs and in the mash hoppers. Supply all the Scratch that the pullets want before going to roost, with enough left over to last until the following noon.

It is essential with this system that the Scratch be consumed before the next feeding the following day.

2. Scratch can be hand fed if the range is clean and large enough to provide fresh areas each day. Only as much Scratch as the pullets will clean up before dark should be fed in the afternoon. As the pullets get older, Scratch can be fed in the morning. Such a system may lead to trouble if the birds leave feed on the ground during wet weather, as mouldy feed will cause digestive upsets.

3. Hopper feeding can be adopted if it is impossible to use the first system outlined. The hoppers should be deep enough to hold several days supply, protected from the rain and built so the pullets cannot spill the feed on the ground.

Such hoppers should be moved a few feet each time they are filled to prevent ground contamination and sod destruction. Keep fresh Life Cycle Mash before the growing pullets at all times. Pullets should not be housed until they reach 20 to 25 percent production.

Life Cycle Mash as a LAYING RATION

As the birds come into maturity and egg production reaches 25 percent, the pullets should be housed. Only the laying pullets should be selected. Those not fully matured should be left on the range several weeks longer.

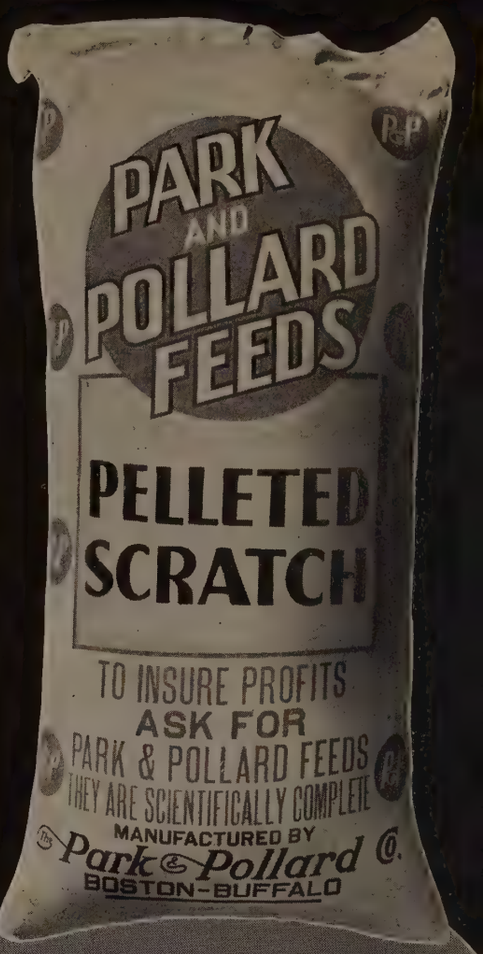
The same general management in housing pullets as outlined on Page 38 should be followed.

Put sufficient Life Cycle Mash in hoppers each day to last the birds 24 hours.

Park & Pollard Pelleted Scratch or Scratch Grain for LAYERS on LIFE CYCLE MASH

The first few weeks after housing, feed pullets the same amount of P & P Pelleted Scratch or Grain that they were fed on the range. As production increases, mash consumption should increase. If production fails to increase, feed less scratch. With Life Cycle Mash it is imperative that the birds consume plenty of mash. Scratch feeding should be governed by the body weight of the pullets. It is advisable to mark ten pullets in every pen and weigh them each week. Pullets should gain slightly at each weighing until they are 10 to 11 months old. If the Scratch feeding will not increase the body weight then feed P & P Fleshing Pellets at noon at a rate of 2 to 4 quarts per 100 birds. During cold weather it is advisable to feed P & P Fleshing Pellets in order to maintain sufficient food intake for high production. During the late spring and summer months the amount of Scratch Grain should be reduced so that the pullets eat at least twice as much mash as grain. The substitution of P & P Fleshing Pellets for some of the Pelleted Scratch or Grain at the night feeding helps maintain good production during hot weather and lessens the tendency of birds to get overfat around the abdomen.

About the first of August egg production can be maintained by using lights. This holds the yearling birds in profitable production well into the fall.



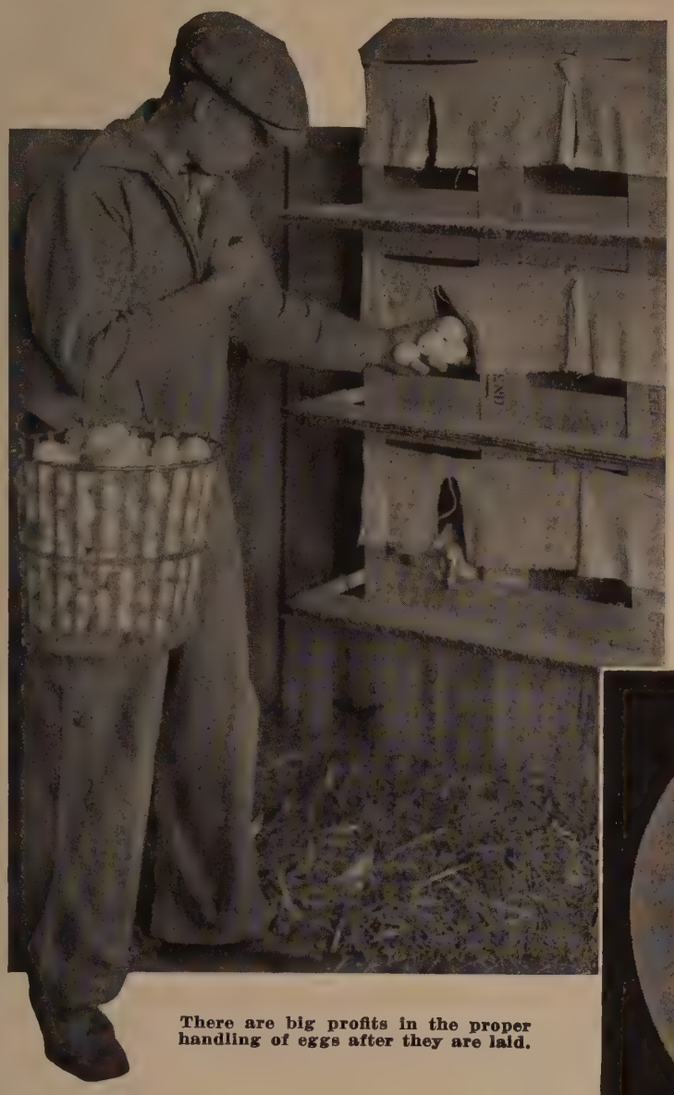
PARK and POLLARD

PELLETED SCRATCH

A LAY OR BUST FEED

Park & Pollard Pelleted Scratch is the finest and only mineralized and vitamized scratch feed on the market. Contains the usual hard grains plus alfalfa, calcium, bone meal, cod liver oil and valuable proteins. Provides a balanced mineral and vitamin intake impossible to obtain with regular scratch grains. Highly relished by birds—more economical than scratch grains—there is no waste with Park & Pollard Pelleted Scratch and its feeding value is higher. Try it!

Producing and Marketing QUALITY EGGS

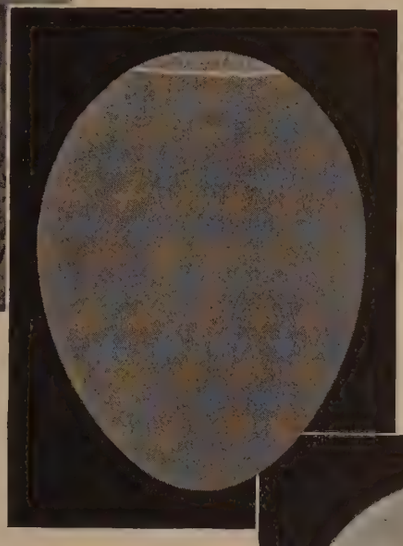


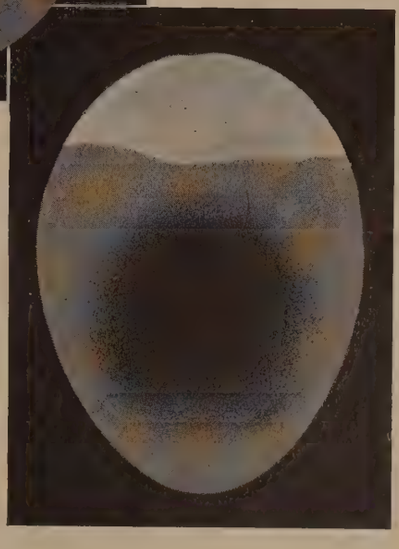
There are big profits in the proper handling of eggs after they are laid.

The poultrymen of the Eastern States are close to the most important consuming centers of the country. These markets are willing to pay for high quality. They represent the eastern poultryman's opportunity for increased profits which are available to him without an increased investment. The production of quality eggs requires only the application of a sound breeding program, proper feeding and, above all, care of the eggs from the time they are laid until they are marketed.

Uniformly large sized eggs of high quality, good color, with thick whites and upstanding yolks will command the top market price. To obtain them, begin with the breeding of the flock and carry through with a sound feeding and management program from the time the chicks are hatched. The poultryman who feeds for health during the growing season profits, not only through lower mortality and high production, but also through improvement in the quality of the eggs.

Eggs are a delicate and perishable food product, subject to rapid deterioration when handled under unfavorable conditions. Being fragile, they are liable to injury or loss by breakage. If eggs are to reach the consumer in good edible condition, they must receive intelligent care and handling from the time they are laid until they reach the consumer's table. In addition, the whole marketing process must be expedited as much as possible, if the enormous waste which now occurs as a result of deterioration and spoilage is to be diminished.





Above
A
fresh
egg.

Right
A
stale
egg.

THE DETERMINATION OF QUALITY THROUGH CANDLING

Quality is determined by five primary factors: size of air cell, visibility of yolk, firmness of the albumen (white), development of germ spot, and condition of shell. This latter factor, although not directly affecting the quality of the egg itself, has a great deal to do with the price on quality eggs.

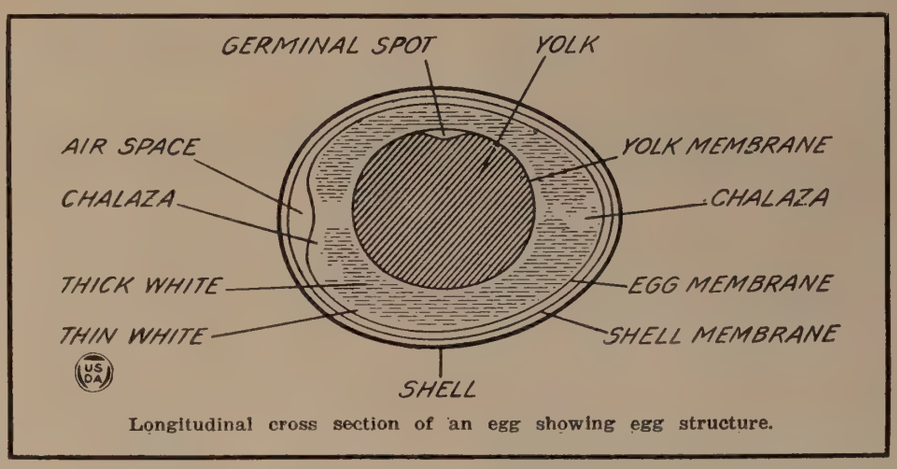
AIR CELL

When laid, the contents of an egg completely fill the shell. When the egg cools, the contents contract, causing a separation of the shell membranes usually at the large end of the egg and producing a space which fills with air, forming the air cell. In a new laid egg the air cell is small, not over three-sixteenths of an inch in depth at the greatest separation of the membranes. The air cell of this kind is often described as being the size of a dime. As an egg gets older, the air cell increases in size as a result of the shrinkage of the contents of the egg. This shrinkage is due to the evaporation of the water from the egg contents. Evaporation is retarded when eggs are properly handled. Although the size of the air cell is not an accurate indication of the age of an egg, it is a good indication of freshness and quality. It indicates the conditions under which the egg was handled. Large air cells are a sign of staleness. Movable air cells indicate a weak-bodied egg and broken membranes.

YOLK

The yolk of a fresh egg is surrounded by thick albumen which holds it near the middle of the egg. When the egg is rotated before the candle, it casts a dimly visible shadow with no distinct outline. The darker and thicker the shell, the less visible it is. It has slow but limited freedom of motion. As the egg grows older, the albumen becomes watery and less firm, which allows freer and more rapid motion of the yolk when rotated before the candle. The yolk in an older egg swings nearer the shell and its outline is more clearly defined. This rapid and freer motion, and greater visibility of the yolk is associated with poorer quality. The

yolk becomes darker and denser in texture as the egg grows more stale. When broken, the yolk of a fresh egg stands up in a globular form, while the yolk of a stale egg flattens out. It is easy to pick up the yolk of a fresh egg with the tips of the fingers without rupturing the yolk sac or membrane surrounding it. As the egg gets older, this membrane becomes weakened and is more easily broken.



Longitudinal cross section of an egg showing egg structure.

ALBUMEN

The white of a high quality egg is firm and clear when viewed before the candle. This firmness is due to the viscosity of the thick albumen. When the egg becomes stale this albumen becomes thin and watery, which permits rapid and free motion of the yolk when the egg is rotated before the candle. The clearness of the egg contents depends upon the condition and color of the shell. The presence of dark shadows in the white of an egg indicates blood clots, meat spots or other foreign particles. Darkened white usually indicates bloody albumen. Quite often an egg shows up having a pale greenish tinge to the white when held before the candle. This is usually caused by feed or some bacterial infection. The yolk itself sometimes shows up with a dark brownish tinge in such an egg. Eggs having these characteristics are termed "grass eggs". When broken out of the shell, the white of a fresh egg hangs together and is very thick and firm with a slight bluish cast in color. It can be picked up readily with the fingers and holds together while rolled about in the palm of the hand. The white of a stale egg is watery, spreads out over a large area and does not lend itself to being handled as do the contents of a fresh egg.

GERM SPOT

The germ spot is the small whitish spot found on the yolk of an egg, and contains the undeveloped embryo. In a fresh egg the germ shows no visible development when the egg is examined before the candle. If the germ is not fertilized, i. e., if the egg is infertile, there will be no visible development of the embryo at any time. It is the development of the fertilized germ, when subjected to heat, that causes rapid deterioration in the quality of an egg, and an enormous loss each year.

The embryo will start growth when a temperature of 68 degrees Fahrenheit is reached. The higher the temperature, the more rapidly the embryo develops. It will continue to grow, as long as sufficient heat is applied or until it dies. Soon after it dies, putrefaction sets in and produces a rotten egg of one of the various classes. When heat is applied and the embryo develops, it becomes more and more visible until it reaches a point when blood appears. As this growth develops, the yolk becomes reddish looking before the candle, and the germ spot takes definite outlines. It is the embryo development up to the time blood appears, that confuses many persons who candle eggs. Eggs with blood rings are the most difficult to detect, particularly in dark shelled eggs.

As soon as blood appears, the egg is no longer fit for food. The development of the embryo before the blood stage is reached affects the quality in direct proportion to such development.

SHELL

In first quality eggs, the shell must be strong, sound, smooth and clean. It must be free from any cracks, checks, ridges or other abnormalities in structure or mottling which may cause weakness. Strength and soundness are necessary to insure shipping and keeping quality. Cleanliness affects both price and keeping quality, because dirty eggs spoil more rapidly.

COLOR, SIZE AND WEIGHT

There are three other factors which affect quality and are desirable attributes of an egg. They are: color, size and weight. These are determined without candling. They have no effect upon the wholesomeness of the egg, but may affect its market price. Whether or not the color will affect the price depends upon the preference, if there is a preference, as to color on the market. White eggs command a premium in some markets, while brown eggs are preferred in others. On any market, uniformity of color is desired, and a mixture or white and shaded eggs (creams and browns) should be avoided if the best prices are to be had for quality eggs. Appearance goes a long way in determining the price on a particular market.

Uniformity in size also affects the market price because of a more pleasing appearance of eggs sorted as to size. Usually small eggs, and those which are so large or so long that they do not pack readily in fillers, should be used at home, or locally and never shipped. Eggs too large for ordinary fillers are apt to break; they are not only a loss in themselves, but they contaminate other eggs which become smeared with their contents, thus lowering the market price of the whole case. Since the food value of a dozen eggs is in direct proportion to their weight, it is obvious that weight should be a more important factor in determining price than it is at the present time. The goal should be 24 oz. or more per dozen.

In addition to the factors already enumerated, eggs should be free from an objectionable flavor or odor. Eggs absorb odors and foreign flavors very readily when stored under undesirable conditions. Feeding is responsible for some of the objectionable flavors. The most common trouble is mustiness due to musty fillers or to storing in a damp place. This objectionable odor can be detected by smell, but many other odors cannot be detected until the egg is broken out of the shell and used. Proper care and handling of eggs should prevent serious trouble in this respect. The gradual adoption of commercial poultry feeding practices on the part of general farmers will tend to reduce off-flavored eggs caused by feed.

Large eggs command a premium. Grade according to size.

1. Poor egg shell structure and texture sometimes is characteristic of individual birds which have not the ability to assimilate the minerals in their diet. Often, however, the trouble can be traced to a lack of sufficient lime in the diet. For this reason, oyster shell should be constantly available to the laying flock. And in addition, the mash should contain the vitamins necessary for proper mineral assimilation.

2. Egg size. Egg size is related to both breeding and feed. A continued low protein intake, due to excessive scratch grain feeding, or too heavy feeding of corn, will reduce egg size. The way the pullets are managed and fed on range is as important in its affect on egg size, as is the management and feeding of the laying flock. Feed a completely balanced ration to assure maximum egg size up to the limit set by inheritance.

3. The vitamin content of the egg is directly affected by the vitamin content of the feed. To obtain eggs of the highest food value, use feeds built to attain this objective. It is possible to get high vitamin content without obtaining too deep orange colored yolks through obtaining vitamin carriers in the feed from the right sources.

4. The color of the yolk is important and is modified by feed. The pale yolk and the deep orange colored yolk are both undesirable from a market point of view. The present day demand is largely for a light golden or straw colored yolk. The extremely pale yolk is low in vitamin value and is evidence of a feed deficiency. The consumer is becoming educated to this fact, and it is for this reason that eggs produced from scientifically balanced feeds are increasing in demand. Lay or Bust feeds produce the kind of eggs the consumer wants —eggs of high internal quality—because they supply everything needed for the maintenance of health in the flock. Healthy, properly fed hens lay eggs of high quality and high nutritional value.

5. The white of a fresh egg should be firm, thick and viscous. When these characteristics are not present in the white of the fresh egg, the bird has either inherited the tendency to produce watery whites, or has acquired it through improper feeding or management during the development period or in the laying house.

6. Bad flavored eggs can be caused by feeding onions, turnips, or excessive quantities of rape. Avoid these plants in feeding laying birds. Usually, however, the cause of the off-flavors in eggs can be traced to handling, between the time they are laid and the time they are consumed. Occasionally, some individual birds will lay off-flavored eggs either intermittently or regularly. This is due to a physiological condition of the bird itself, or to inheritance, and can be corrected only by the removal of the offenders.

The normal strictly fresh egg has a firm, dense white and a firm, upstanding yolk. In our study of internal quality we have cracked many thousands of eggs from birds fed on many different feeds. Years ago we found a definite relation between feed and egg quality as to the several important characteristics mentioned above.

These are extremely important. Poor shell texture and structure, poor color, off-flavor and eggs of low vitamin value or with weak whites and flabby yolks, should be guarded against by following a sound feeding program from the time the birds are hatched through the laying period.

THE RELATION OF BREEDING TO EGG QUALITY

Good breeding is the profit foundation of every phase of the poultry business. The internal and external quality of the eggs at the time they are laid is no exception.

BREEDING IS CLOSELY RELATED TO:

1. Egg size.
2. Shell color.
3. Shape of egg.
4. Interior quality.

The only means the poultryman has at his command to increase the general egg size of his flock is through selection, for hatching purposes, of large eggs from consistently large egg producers. Then, by proper feeding and management, develop those birds to the maximum of their inheritance.

Shell color, too, is inherited. To obtain uniformity of color, and to get rid of tints, requires careful selection of the breeding stock for uniform egg color, over a period of years.

To eliminate off-shaped eggs, never hatch from anything but eggs of the desired shape. It is impossible to modify egg shape through feeding or management. It is entirely inherited, except for occasional abnormalities.

Although interior quality is inherited to a large degree, it can be modified by feeding to a considerable extent as has already been explained.

HOW TO MAINTAIN QUALITY FROM THE NEST TO CONSUMER'S TABLE

Internal egg quality is under the control of the poultryman in large measure through (a) proper feeding and (b) proper handling of the eggs after they are laid. Many losses due to poor quality can be eliminated by any poultryman if he will follow a few simple rules for gathering, handling and marketing his eggs.

THE RELATION OF BREEDING TO EGG QUALITY

1. GATHER EGGS TWO OR THREE TIMES DAILY

Gather eggs in wire baskets. They will cool more rapidly than if pails are used and will not sweat.

In very hot weather eggs should be gathered three or more times daily; in cool weather twice a day may be sufficient. Frequent gathering has three main advantages:

1. It helps to prevent damage from heat and cold.
2. The proportion of cracked and broken eggs is reduced.
3. There are fewer dirty eggs.

It is especially important to gather eggs frequently when poultry yards are muddy and the laying flock is not confined.

2. HOLD EGGS IN A COOL PLACE

As soon as eggs are gathered, take them to a cool place and keep there until they are sold. Never leave them at the top of the cellar steps, under the kitchen stove, or in a warm feed room.

Leave warm eggs in an open basket until they have cooled. Eggs cool very slowly in an egg case. With their fillers, flats and pads the cases are good insulators, especially if the lids are nailed on. Insulation is an advantage with well cooled eggs, since it protects them when the case is exposed to warm air for a limited time. It is a disadvantage with warm eggs since it prevents the rapid loss of heat so essential to proper egg cooling.

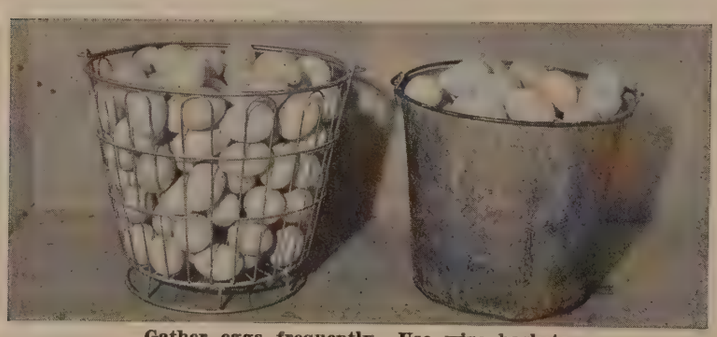
Hold eggs in a temperature of 32 to 60 degrees F. and, within these limits, the lower the temperature the better they will keep. See temperature guide, page 56.

On most farms, the cellar is probably the best available place in which to hold eggs—provided it is free from strong odors and not musty. Eggs, like milk, may be tainted by strong odors. If the cellar floor is too damp, place the cases on boards or bricks.

Eggs soon deteriorate if left where it is too warm and dry. The water in the egg evaporates, the air cell enlarges, the white becomes thin and the yolk enlarges and weakens.

3. GUARD AGAINST FERTILE EGGS

An income of five million dollars is estimated to have been lost by the egg producers in one state alone in one year as a result of marketing low quality and bad eggs. To fertile eggs can be laid the blame for a high proportion of rotten eggs as well as eggs of poor quality. In a survey of 360 farms made in one section it was found that 80% of the flock owners were producing fertile eggs during all seasons. A community that follows this practice cannot hope to get a premium for its market eggs.



Gather eggs frequently. Use wire baskets.

Do not produce fertile eggs except for hatching purposes. Even then, remove the male birds from the laying flock at the end of the hatching season. Return them a few days before fertile eggs are again needed. A common cause of fertile eggs in the fall months, and one which is generally overlooked, is fertilization by the young cockerels.

If the weather is warm, an incubator or a hen is not necessary to start the development of a fertile egg. Eggs may develop hatch spots and blood rings while in the producer's kitchen, in the back of a country grocery store, or on the city retailer's counter.

When a fertile egg is exposed to a temperature about 69 degrees F., the germ begins to develop. In the early stages this development is often called a "hatch spot" or "heat spot". An egg in this condition is still regarded as edible but it will not grade as high as a strictly fresh egg.

As development continues, blood becomes evident and gradually a small ring forms. The name "blood ring" is applied to such eggs in the egg trade. Development is rapid when an egg has reached the blood-ring stage. The killing of the embryo at this stage by cooling is the cause of a large proportion of the rotten eggs received on the market. An infertile egg seldom rots.

Left—Many egg quality factors are due directly to breeding.

Right—Hold eggs in the coolest possible place.

"Blood rings" are classed as inedible. Each year thousands of cases of such eggs are sorted out and dumped.

Producers should realize that it usually takes considerable time for eggs to find their way through the hands of a country buyer, a shipper, and a retailer, and that a day or a week may elapse between the time a particular dozen goes over the retail counter and the time when the last egg is used. Most country and city grocers and even many consumers do not keep their eggs under refrigeration. Is it any wonder that fertile eggs, especially in warm weather, are seldom entirely satisfactory to consumers?

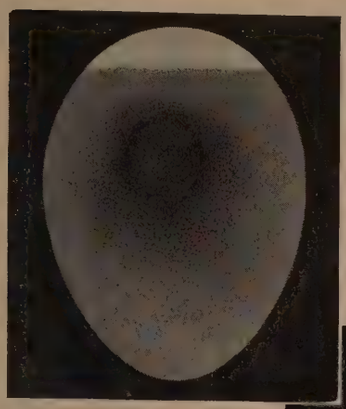
4. PROPER HOUSING ESSENTIAL FOR PRODUCTION OF CLEAN EGGS

Dirty eggs nearly always sell at a considerable discount under clean stock, not only because they are less attractive to customers, but also because they spoil more readily. It seems safe to say that there is much less difference between the cost of producing clean eggs and dirty eggs than there is between the selling prices of clean and dirty eggs.

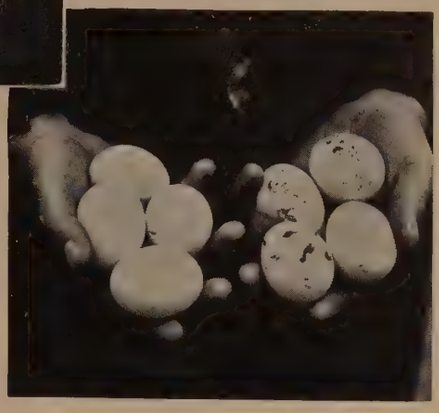
Overcrowding is a common cause of dirty eggs. Avoid it by allowing four square feet of floor space per bird for medium weight or heavy breeds and three and a half square feet per bird for small breeds. Too few nests cause many broken and soiled eggs and encourage hens to form bad habits such as eating eggs and laying on the floor. Provide one nest for each five birds and construct them to prevent birds from roosting on the sides.

Dropping boards under the roosts help keep the floor litter and the eggs clean, especially if the hens are kept off the boards by a coarse wire screen. Change floor litter and nesting material frequently to prevent their becoming damp and dirty.

THE RELATION OF BREEDING TO EGG QUALITY



Large numbers of muddy and soiled eggs reach the market in the spring months. Since they are not desirable either for storing or for immediate retailing, they, of course, reduce the general level of egg prices. Most of these eggs need not have become dirty. By more frequent gathering, and by partial or complete confinement of the hens, they could have been avoided. Various tests indicate that most eggs are laid in the forenoon and that 70 to 75% are laid by 1 p. m. If it is not desirable to confine the flock all day, most of the dirtv eggs may be avoided by confining the layers until 1 p. m. and gathering the eggs before turning the hens out.



Upper left—Typical example of egg showing blood ring.

Above—Dirty eggs must be sold at a discount.

Below—Clean nests are essential to producing clean eggs.

Washing may seem to be a simple remedy for dirty eggs, and for a few eggs which are to be used quickly in the home it is satisfactory. Egg buyers, however, insist that market eggs should never be washed, and that steel wool should be used for cleaning. Washing removes the protective coat or "bloom", opens the pores and permits more rapid evaporation. Bacterial infection may set in, causing the eggs to deteriorate more quickly.

Farm flock owners might well follow the practice of commercial poultrymen by screening droppings boards.

5. SIZE, COLOR OF SHELL AND SHAPE IMPORTANT. HENS PRODUCING POOR EGGS MUST BE CULLED OUT.

The producing of eggs of uniform color and of good shape and size is a difficult problem. A reasonable degree of uniformity can be obtained by using one breed and culling out the hens laying eggs that are undesirable because of shape or shell color. If plenty of limestone or oyster shell is being fed, sell hens laying weak-shelled eggs.

Size of egg is always important. On the eastern market sharp price cuts on small eggs are the rule. Eggs should weigh 24 ounces or more to the dozen. Replace mature hens laying eggs under this weight gradually with a strain laying larger eggs. Allow pullets one to three months to reach this size.

Certain production costs, such as those involved in housing hens, gathering eggs, and casing, are about the same regardless of the size of egg produced. Marketing costs for cases, trucking and freight are usually figured on a case basis, so that net return to the producer of small eggs is often low.

A high degree of uniformity of color and shape, together with good size is, of course, desirable; but this is one of the finer points which is primarily a problem to be solved by the breeder, except as outlined under the "Relation of Feed to Egg Size".

The average farmer, however, can accomplish a good deal by the judicious culling of his hens and careful selection of hatching eggs. Perhaps the best way for the average producer to obtain large, uniform eggs is to buy good standard bred chicks of one breed and from a strain bred for egg-size as well as for number of eggs laid.

MARKETING GOOD EGGS

Increased income is the main incentive for producing a high grade product. Every possible attention may be given to the details of producing high-quality eggs, but still these eggs may not reach the market in good condition nor return a premium. Some attention must be given also to methods of marketing and to market requirements.

GRADE TO SUIT YOUR MARKET

The type of market to which one sells and the size of the flock are important factors in determining whether the eggs should merely be sorted for size, color and cleanliness, or should be also carefully candled before use or sale. The producer should sort and candle carefully. Small, dirty, cracked, or extremely large eggs, as well as eggs showing large air cells, weak or watery whites, meat spots, blood clots, and, of course, blood rings and rots should be removed. Eggs of uniform color look much better than mixed lots.

When large numbers of small pullet eggs are to be disposed of, it is usually better to sort them to the same standard of quality as the regular eggs and sell them separately as pullet eggs rather than cause dissatisfaction by including them with regular stock. A popular way of using pullet eggs for private trade is to sell 14 to 18 eggs, depending upon their size, at the same price as one dozen regular sized eggs.

Use steel wool for cleaning.

DELIVER EGGS FREQUENTLY

The frequency with which eggs should be sold depends mainly on the place the producer has in which to hold them, the

trouble and expense of delivery, and the quality demanded by his market. As a rule, eggs should be marketed twice weekly. If no additional expense is involved, the more often delivery is made, the better. Remember that some time is required for eggs to get through the usual channels of distribution, and they cannot be expected to reach the consumer in as good condition as when they were first sold.

Candle as gently as possible at all times. Even if eggs are not cracked by rough handling and long hauls, they may grade lower because such handling tends to loosen the air cells. On the market, a tremulous air cell is usually regarded as an indication of weak body.

Candling and grading eggs on the farm.

ATTRACTIVE PACKAGES SELL MORE READILY

A clean, strong case always makes a better impression on the buyer than a dirty or broken one. Do not use dirty or moldy fillers, flats, or pads, and never substitute newspapers for flats or pads. Individual packages for private customers should be carefully watched, as broken or soiled containers and fillers may give the impression that the producer is careless and dirty.

Clean, strong, properly nailed cases with new fillers and new flats of one of the improved type should be used when shipping high-grade eggs to central markets. The use of new cases and new flats is often the reason for some shipments arriving in good condition and receiving premiums, while other lots, packed in old cases or with old flats, arrive with some eggs broken and others so soiled that no premiums are obtainable. Label cases plainly with the name and address of both the receiver and shipper.

When casing eggs, acquire the habit of placing the large end up, as the air cell is normally in this end. When placed small end up, rough handling may loosen the air cell and cause the eggs to grade lower.

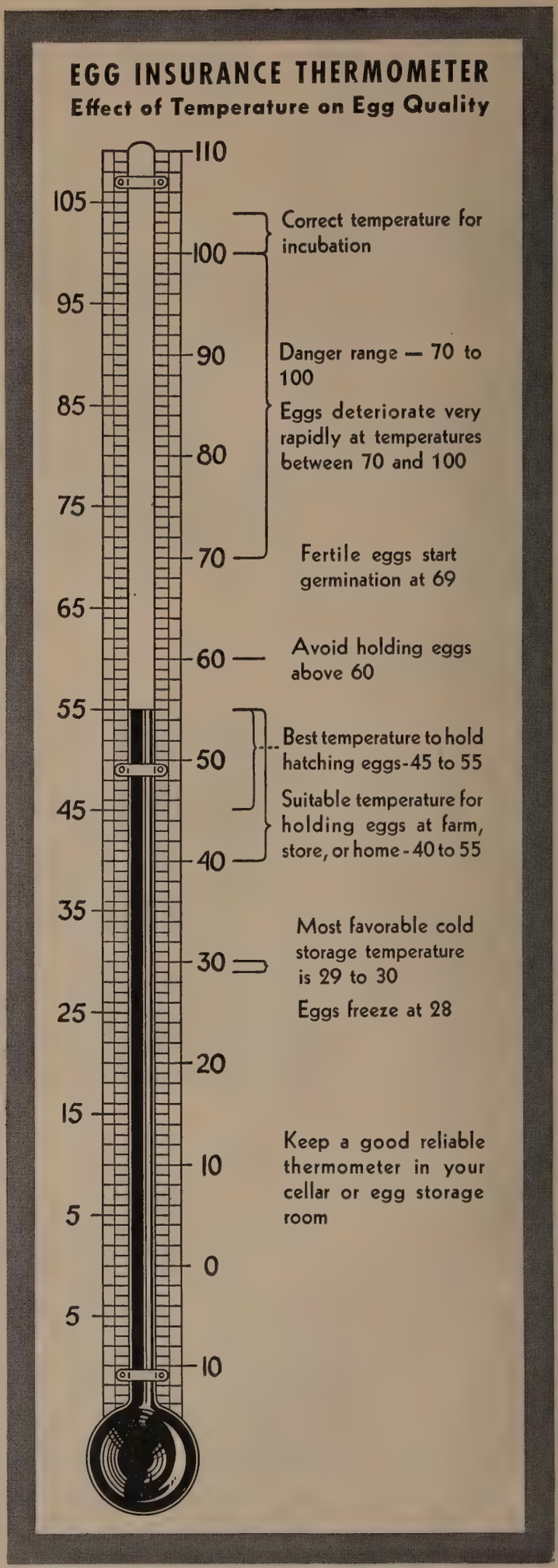
SHELL COLOR REQUIREMENTS VARY IN DIFFERENT MARKETS

New York is commonly called a white-egg market, yet it furnishes an outlet at a premium for fancy brown eggs. Boston, noted as a brown-egg market, also absorbs some white eggs.

Color of shell is, of course, a breed characteristic and cannot be changed without changing breeds, but yolk color may be changed by adjusting the kinds and proportions of feed used. Lay or Bust feeds are built to produce the kind of yolks in greatest demand in the East.

To produce eggs of high internal quality requires good feeding. You will get uniformly high quality in the new laid eggs produced the Park & Pollard way. To maintain that quality up to the consumer's table, realize that eggs are extremely perishable and handle them accordingly.

Feed and inheritance are important factors in providing egg quality—but they cannot maintain it. Anything you, as a producer, can do to improve the quality of your eggs will repay you many times in the higher prices they bring.



The Prevention and Control of POULTRY Diseases*

N. A. Hagan, Dean of the New York State Veterinary College, says "Of all the domesticated animals, poultry suffers the greatest losses from disease. These birds generally eat from the ground, and many flocks are kept on a small range. These conditions favor the rapid spread of disease and the increase in parasitisms. Furthermore, it is evident that breeding for production often, and perhaps always, favors the development of disease by placing a greater strain on the constitution of the bird than nature intended it to bear. . . . ."

"Means for preventing excessive losses from many of the infections and parasitic diseases are at hand. The problem is to bring into actual use the information about these diseases. . . ."

"Instead of trying to cope with their own poultry-disease problems, or instead of shipping materials to distant laboratories for advice, many poultrymen would find it advantageous to seek help and advice from their local veterinarians who, by visiting the flock and studying the situation, should be able to give more intelligent advice than can be obtained from a distant laboratory . . ."

In this we concur. The veterinarians of the country are becoming increasingly aware of the opportunity that exists for them in the field of poultry husbandry, and an experienced man on the ground can make a more accurate diagnosis and can be of more assistance in solving the problem than is possible from a distance.

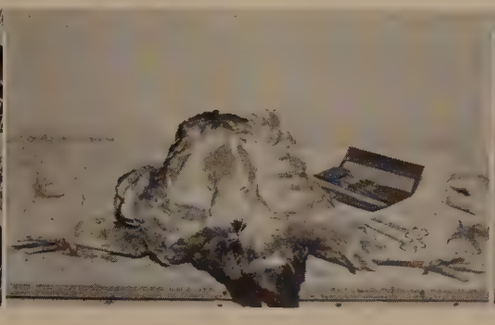
"An ounce of prevention is worth a pound of cure." A correct breeding, feeding and management program is intimately associated with the development of constitutional vigor and the prevention of disease. Brooder house, range and laying house mortality must be kept at a minimum if maximum profits are to be realized.

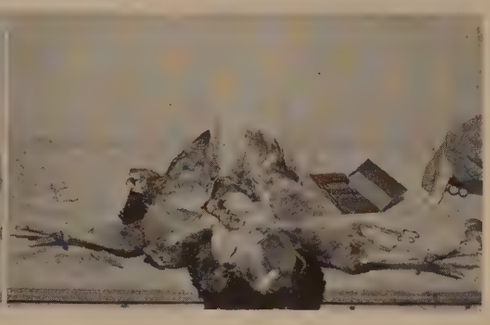
The poultry raiser, who can recognize common diseases when they appear in his flock, can often avoid serious losses by adopting proper control measures as soon as the first symptoms are noticed. For this reason every poultry raiser should know how to make a simple post mortem examination.

The steps in making a post mortem examination are as follows:

1. Kill the bird by dislocating the neck at the base of the head.
2. Split the skin along the breast bone to the vent, exposing the breast, crop and abdomen.
3. Break the leg joints outward at the hips.
4. Cut under and at each side of the breast, and completely remove the breast.
5. Examine the crop, liver, heart, spleen, lungs, kidneys and

* In the preparation of this article we have drawn from our own Research material and from several of the more recent bulletins of leading Agricultural and Veterinary Colleges. We wish to acknowledge our indebtedness particularly to Prof. Erwin Jungherr of Connecticut State College for his assistance in and editorial contribution to the preparation of this material; also to the New York State College of Agriculture for photographs used as illustrations.





HOW DISEASES ARE INTRODUCED AND SPREAD

DISEASES	METHOD OF SPREAD	PREVENTION
Pullorum	Eggs, incubators, chicks and adult carriers.	Purchase eggs and chicks from disease-clean flocks.
Fowl Typhoid	Probably eggs, incubators, carriers.	
Fowl Pox	Blood sucking insects, especially mosquitoes.	Sanitation. Vaccination in infected areas.
Chicken Tapeworms	Through flies, snails, slugs and beetles.	Range Sanitation. Proper manure disposal.
Coccidiosis	Damp litter, Damp Food and contaminated droppings. Poor Ventilation.	Keep litter dry through proper ventilation.
Cannibalism, Feather Pulling, Toe Picking	Overcrowding, Overheating, Too much light, Too much hard grain.	Provide ample room in houses and on range for chicks. Reduce heat, light and hard grain.
Rickets, Slipped Tendons.	Feed Deficiency.	Feed Lay or Bust Feeds.
Laryngotracheitis	Adult-carriers.	Do not introduce adult birds or return birds from shows and contests. Vaccinate infected flocks.
Infectious Colds	Adult-carriers. Contaminated equipment.	Do not introduce adult birds or return birds from shows or contests.
Diseases in General	Newly purchased adult birds. Crates returned from market.	Quarantine for 14 days before placing with regular flock. Store away from poultry plant and feed room. Do not use to move birds about on this farm.
	Visitors to Farm.	Do not permit indiscriminate wandering about the farm.
	Animals and Wild Birds.	Control cats and dogs, rats and mice. Keep wild birds from pens and away from the range as much as possible.
	Overcrowded or long-used ranges.	Do not overcrowd. Rotate rang es as often as conditions permit.
	Feed Sacks when used to carry diseased birds.	Do not carry sick birds in sacks that are to be used for feed again.
	Carcasses dead birds.	Remove at once and burn. Segregate or dispose of all sick birds if disease warrants.

intestines.

6. Take out the intestines and examine the surface the full length before slitting to examine the inside.
7. Examine the mouth cavity, nose, throat and windpipe.

Disinfection tank made from an oil barrel. Courtesy, N. Y. State College of Agriculture.

DISINFECTION

Disinfection means the removal or destruction of disease germs and plays an indispensable part in any program of adequate sanitation on poultry farms.

All dirt, litter and manure should be removed from the pens and equipment before efficient results can be obtained from disinfectants.

Disinfecting can be accomplished with heat, fumigation and liquid chemicals.

HEAT derived from the use of a fire gun, although popular at one time was over rated in its value as a disinfectant. Boiling water kills germs immediately but outside of small equipment it has little practical use on poultry farms.

FUMIGATION is most efficient in controlling diseases in incubators, but for other use its value is questionable.

LIQUID DISINFECTANTS are the most effective means of disinfecting houses and equipment. Small utensils such as mash hoppers, water fountains, etc., may be soaked in a vat containing a strong solution of disinfectant.

QUICK LIME slaked with water and applied at once has some disinfecting properties. Whitewash can be made more effective by adding 2 to 3 per cent of some good liquid disinfectant.

CHLORINE products are of value in cleaning drinking utensils and have germ killing properties when added to the drinking water. It is most important when using such products to follow the maker's directions for its use.

DISEASES OF BROODER CHICKS

To assist in the recognition of chick diseases in the field we present the table below taken from Bulletin 202 of Storrs Agricultural Experiment Station, by Erwin Jungherr.

BROODER PNEUMONIA

Brooder Pneumonia is caused by a mold of the Aspergillosis group and is therefore also known by the name of Aspergillosis. The infection is accompanied by symptoms of heavy breathing, gasping for air and droopy wings. Similar symptoms may be caused by pullorum disease but the conditions can be differentiated only through laboratory examination.

The chicks usually acquire the infection from litter that has been wet and moldy. Straw, hay are also apt to carry molds that will cause Aspergillosis and therefore should not be used unless perfectly sweet.

There is no known treatment.

BOWEL TROUBLE (Pasting Up)

Young chickens frequently have a diarrhea that is responsible for the so-called pasting up condition around the vent. The majority of these cases is non-infectious and may be the result of chilling, overheating or eating too much litter.

In mild cases, a physic will relieve the diarrhea and, if the chicks are properly taken care of, no more trouble is experienced.

When chicks have been severely chilled, overheated, or both, high losses may be experienced and the survivors may not be worth raising for layers.

Eating excessive amounts of litter may cause plugging of the vent, a fatal condition unless treated in time.

DISEASES OF BROODER CHICKS

Usual Age in weeks when disease appears	Symptoms	Lesions	Disease Suspected
1—3	Whitish diarrhea; pasting-up; droopiness; gasping; sweating.	Large streaked liver; large cheese-like egg yolk; nodules on heart or in lung; air sacs normal; cheese-like material in blind guts; kidneys swollen.	Pullorum disease (Bacillary White Diarrhea).
1—3	Yellowish diarrhea; pasting-up; droopiness.	Large egg yolk containing dirty-yellow fluid, enlarged gall.	Nonspecific bacterial infections (common diarrhea).
1 or less	Swelling in navel region; stunted; sudden death.	Tissue in navel region bloody or water-logged; adherent large egg yolk; enlarged yellow liver.	Navel-Ill (mushy chick disease).
0—3	Sudden deaths following exposure huddling.	Congestion of lung and other organs, enlarged gall, leg bones soft, no food in intestinal tract, kidneys normal in size but pale, liver yellowish.	Chilling or over-heating (exposure).
2—7	Large crops, droopiness, poor growth.	Thick whitish to grayish false membranes in crop; ulcerated gizzard.	Sour crop (fungous infection).
6—	Greenish diarrhea, poor growth.	Large cheese-like material in blind guts, cart-wheel-like yellowish round areas in liver.	Blackhead.
3—7	Bloody diarrhea.	Blind guts filled with blood or cheesy material, carcass anaemic.	Bloody (cecal) coccidiosis.
4—	Diarrhea, droopiness, poor growth.	Reddish to whitish dots or streaks on the outside of intestine; swollen mucus membrane of intestine tinged with blood.	Intestinal coccidiosis.
2—4	Running nose, watery eyes, gasping.	Mucus in mouth and nasal passages, occasionally yellowish air sacs of lungs.	Infectious cold (coryza).
6—	Lameness usually in one leg, droopy wing, paralysis of crop, blindness.	Enlarged leg or shoulder nerves, occasionally tumors.	True fowl paralysis.
1—4	Dumpish, sudden deaths.	Swollen pale kidneys, whitish material on heart sac.	Gout.
3	Droopiness, lameness.	Good flesh, slightly enlarged congested kidneys.	Protein poisoning (crazy chicks).
2—4	Inward curled toes, lameness in both legs, squatting.	Good flesh, sometimes slight jaundice of breast muscle.	Nutritional paralysis.
4—10	Lameness in both legs.	Thick joints, soft bones, crooked breast bone.	Rickets (vitamin D deficiency).
4—10	Poor growth.	Prominent follicles, whitish membranes in esophagus; swollen pale kidneys.	Nutritional roup, vitamin A deficiency.
4—	Walking on hocks, shanks twisted, deformities of legs.	None in internal organs; tendons of hock joint misplaced.	Slipped tendon (hock disease, perosis).
3	Poor growth.	Old blood spots in hard lining of gizzard; underlying tissue of gizzard opaque or water-logged, hard lining peels off easily in fresh specimens.	Ulcerated gizzard.
June	Sudden deaths after ranging.	Rose chafers in crop.	Rose chafer poisoning.

From Bulletin 202-Conn. State College.

Treatment: For a mild flush 1 teaspoonful of epsom salts is given in one gallon of water for chicks one week old. Chicks two weeks old should receive twice as much salts in one gallon of water, the flush to be given for a period of 6 to 8 hours.

OMPHALITIS (Mushy Chicks)

Mushy Chicks Disease is a disease of very young chicks that comes from the lack of proper sanitation in the incubator.

The chicks' navel becomes infected and does not heal. The disease appears during the first days of brooding, reaches its height by the sixth day and disappears entirely by the tenth day. The wet form appears sooner after hatching and has a more rapid course than the dry form.

Affected chicks die suddenly without exhibiting signs of any disorder other than appearing stunted and groggy. The trouble may appear under the most favorable conditions of brooding and management. On post mortem examination, the wet form is characterized by a water logged condition of the abdominal skin and by dark reddish hemorrhagic changes in the region of the navel, the unabsorbed yolk is found glued to the inside of the abdominal wall.

Treatment: No treatment is available for this condition and the only effective preventive measure is adequate and frequent cleaning and disinfection of incubators and hatching compartments.

BACILLARY WHITE DIARRHEA (Pullorum Disease)

Bacillary White Diarrhea once constituted the greatest single menace to the poultry industry but due to the discovery of the causative organism by Dr. L. F. Rutger of the Storrs Experiment Station, it has become possible to perfect accurate methods of identifying the disease in the blood of both young and old birds.

Through yearly testing of adult breeders the disease has gradually come under control so that today pullorum disease is rarely a serious problem on Northeastern poultry farms.

The disease is caused by a bacterium which is easily spread from infected to healthy chicks in the brooder house. The most serious source of infection is the infected eggs from pullorum diseased chicks, since only a few pullorum infected eggs in the incubator can spread the disease and infect many healthy chicks.

The death rate from the disease is heaviest during the first few days after the chick hatches and continues usually to about three weeks of age. The amount of the loss will vary with the degree of infection and can run in severe cases as high as 100 per cent.

Not all the infected chicks will die and survivors are apt to be runty at maturity.

Chicks that have a mild infection and do not succumb may later be carriers of the disease in that the pullets lay eggs infected with pullorum disease. Even the presence of a few breeder carriers of pullorum disease can, in one season, cause a serious outbreak of the disease and thus it is advisable to test all breeders each year before the hatching season. New stock should be obtained from sources known to be 100 per cent free from this disease.

SYMPTOMS

Today a brood of chicks is seldom heavily enough infected to show the typical high mortality which was so characteristic of the disease some years back.

Chicks affected show lack of appetite, act dumpy and stay near the brooder stove, letting the wings droop. There may be some whitish diarrhea but this condition can be caused by disorders other than pullorum disease.

Post mortem findings in the field may show unabsorbed yolk. The liver and heart may be dotted with small lesions. If the infection enters the body through breathing there may be small yellow nodules in the lungs.

In all cases where there is mortality in young chicks which cannot be explained satisfactorily, dead or dying chicks should be submitted to a veterinarian who is equipped for the work or to the State Poultry Laboratory for diagnosis.

The only positive way of identifying pullorum disease in affected live birds is by bacteriological methods in the laboratory.

TREATMENT

There is no satisfactory treatment for the disease in affected live birds. The spread of infection should be checked by removing all diseased or exposed chicks from the farm. The litter should be removed and burned and the houses thoroughly disinfected.

PREVENTION

The only satisfactory prevention against pullorum disease is to have the breeders tested each year or to purchase hatching eggs or baby chicks from pullorum clean flocks.

Today there are few recognized breeders in the Northeastern States who do not test regularly and whose flocks are not 100 per cent free from the disease. The most accurate test for the detection of pullorum disease in the tube agglutination test.

EPIDEMIC TREMOR

Epidemic tremor, often called "Trembling Chick Disease," is rather a recently recognized disease of baby chicks affecting the nervous system and resulting in a trembling of the head, neck, or tail, especially on excitement. This disease affects the co-ordination of the muscles and trembling may be entirely absent.

The present opinion is that the disease is caused by a filterable virus, but the method of transmission is unknown.

It may suddenly appear in all groups of chicks from one hatch and then may not appear again during the hatching season. It has been impossible to lay the blame on either faulty incubation, condition of the breeding stock or feeding either of the breeders or the chicks affected.

The disease appears in the middle of the second week in the brooder house and at first is not easily recognized, for the chicks affected are apt not to be moving around as much as the normal chicks. The trembling condition and lack of muscle co-ordination is apparent when the chicks are made to move about rapidly.

The mortality may run high as 50 to 60 per cent but usually the losses are confined to 15 to 30 per cent. There seems to be nothing that can be done for the chicks affected and the disease usually disappears of its own accord by the end of five weeks.

Positive identification cannot be made except through microscopic examination of body tissues especially of the brain and spinal cord.

The disease so far has not been found to be contagious and has only been transmitted from affected chicks to healthy ones in the laboratory by injections into the brain.

Until more is known about this disease, no treatment can be advocated.

CRAZY CHICKS

A condition has appeared in recent years usually in fast growing chicks between the ages of 3 to 5 weeks and has been called "Crazy Chick Disease" due to the characteristic staggering gait and loss of muscular control.

Chicks affected are unable to maintain their balance, pitch forward or backward and finally are unable to walk. Death may be sudden and yet others may linger for several days. Quite often chicks that are unable to reach food for several days recover sufficiently to enable them to walk.

The cause of the trouble is believed to be due to the excessive amounts of protein the bird's system is forced to handle during heavy food intake.

Also the fact that the largest birds are the first to come down with this trouble would indicate that it was a feeding problem.

Excessive heat in the brooder houses has also been thought of as a contributing factor to this trouble.

TREATMENT

Reducing the amount of protein by diluting the ration with

A chick affected with caecal coccidiosis. Courtesy, N. Y. State College of Agriculture.

oatmeal and bran seems to help in correcting this condition. If lights are being used the mash hoppers should either be empty or removed during the night so that digestive tracts of the chicks can get a normal amount of rest.

COCCIDIOSIS

Coccidiosis is rather an old disease but was of little importance until the advent of mass production of poultry. With the growth of the industry and the extension of the brooding season the conditions for the growth and spread of coccidiosis became so favorable that the disease soon became the outstanding menace during the brooding periods.

Coccidiosis cannot be eradicated from a farm nor can the chicks be vaccinated against it.

Poultrymen are now resigned to living with the disease but through careful management, have created conditions which are unfavorable to the coccidia and thus keep the disease in check.

Left—A normal calcum. Right—Chick affected with coccidiosis. Note the relative difference in size. One calcum has been opened showing the dark, bloody contents. Courtesy, N. Y. State College of Agriculture.

It is believed by many that it is safer to allow the chicks to have a milk infection of coccidiosis early in life, thus building up a degree of immunity against the disease later.

Chicks grown under highly sanitary conditions sometimes experience severe losses later on the range or in the laying house when exposed to coccidiosis. It is therefore believed to be more economical to take losses early in life when little money is involved rather than later when the birds are fully grown.

CAUSE

Coccidiosis is caused by a microscopic animal which lives and breeds in the mucous lining of the intestinal wall of chickens. They multiply there at a tremendous rate and pass eggs (oocysts) out of the bird's body through the droppings. These eggs are not infectious until hatched, a process which requires at least 24 to 48 hours in a warm, moist place.

TREATMENT OF BLOODY COCCIDIOSIS

Bloody coccidiosis is the type most easily recognized by the average poultryman.

The first symptoms of approaching infection will be a drop in food consumption of the birds and if flushed at once little mortality will be experienced and the flock suffer no permanent ill effect.

Within 24 hours to 48 hours after the first symptom, profuse bloody droppings are passed and mortality sets in. The feathers become ruffled and as the disease progresses pigmentation of beaks and shanks begins to disappear.

For the bloody type of coccidiosis, milk flushes have long been advocated at the rate of 30 pounds of skim milk powder to 70 pounds of chick ration, fed for 24 to 36 hours.

Poultrymen operating large farms are now using epsom salts with a higher degree of satisfaction and at far less cost than the milk flushes.

An epsom salts flush is given at the first appearance of the trouble. At 2 P. M. the birds should be flushed with epsom salts for the rest of the day at a rate of 1 pound of salts to four gallons of water. The droppings will be passed out at night and on the next morning the pens should be thoroughly cleaned.

Thereafter the pens should be kept dry and for chickens up to 8 weeks of age plenty of heat should be supplied. It is usually a poor plan to take all heat away from brooder chickens as it is almost impossible to keep the litter bone dry unless the chicks are being brooded very late in the spring.

The source of the infection should be determined and corrected. Bare floors around the mash hoppers, damp litter or contaminated drinking water are sources of infection.

This type of coccidiosis responds readily to treatment. The birds recover rapidly and if no further infection sets in the birds develop into normal pullets capable of high production.

TREATMENT OF INTESTINAL COCCIDIOSIS

Intestinal coccidiosis constitutes an infection of the intestines and certain forms of infection may be as acute as the caecal type. Some blood may be discharged with the droppings and sudden deaths are common. The chronic cases are characterized by loss of flesh and reduced pigmentation of the beak and shanks.

The intestinal type is much more difficult to treat owing to the severe injury to the intestinal tract. In most cases the injury to the intestines cannot be repaired and only in the case of young chickens which have been promptly treated does new intestinal growth take place sufficient for the needs of normal digestion and food assimilation.

The injury to the intestine is the cause of birds going light and wasting away although they are consuming normal amounts of food.

Giving a flush of epsom salts as soon as possible, thoroughly cleaning the pen, eliminating source of the infection and adding 5 to 10 per cent milk to the ration for several weeks may save birds with milk infections of intestinal coccidiosis.

Badly infected birds 10 to 20 weeks of age should be disposed of, otherwise they will be unprofitable as layers and the mortality in the laying house will be high.

Follow the coccidiosis control plan outlined on page 31. It is a satisfactory means of preventing and controlling this form of coccidiosis.

CANNIBALISM

Cannibalism still constitutes a major problem where large numbers of birds are raised under intensified conditions. Cannibalism is most prevalent in the young stock during brooding and in the pullets and older laying birds.

In practically all cases where cannibalism has started, it can be traced to faulty management or feeding practices. In young chicks overcrowding, too much heat, lack of enough hopper space and excessive amounts of scratch grain will start cannibalism. It is true, some strains show a greater tendency to cannibalism, and strains that feather slowly should be handled with more care, in order that the habit does not start early in the chick's life.

TREATMENT

Reduce the number of chicks in a pen, remove all picked birds and treat with tar or anti-pick salve. Reduce the temperature of the room to about 70 degrees. Allow the chicks to go out of doors, if possible.

If scratch grain is being fed reduce the amount and increase the amount of whole oats fed. Hopper feeding whole oats or feeding some germinated oats for a week or so will tend to stop picking.

If picking or cannibalism cannot be stopped by the above methods, the chicks should be "beaked". This can be done by paring off the tip of the upper beak with the aid of a jack-knife.

PULLETS ON RANGE

Feather pulling and bob tails are often experienced even with birds that leave the brooder houses well feathered. Ranges without shade, insufficient hoppers, small yards that are overcrowded and ranges free from sod are often factors leading to this condition. Overcrowded shelters and keeping the birds confined too long after daylight probably causes the most trouble.

TREATMENT

Correcting the conditions just mentioned and applying anti-pick salve to the birds will prove the most satisfactory means of stopping the picking.

CANNIBALISM AND PICKING IN LAYING HOUSE

Birds that have picked in the brooder house or on the range should be watched closely for they are apt to be the most troublesome in the laying house.

Pullets just housed and overcrowded are apt to pick unless they are kept busy. Scattering some grain in the litter frequently keeps the birds busy. Excessive amounts of scratch grain after the birds have reached 50 per cent production or better is, in most cases, the cause of outbreaks of cannibalism and picking.

Insufficient hopper space, nests built too low to the floor or on the floor and too few nests often start pick-outs.

TREATMENT

Allow four square feet per bird, reduce the amount of corn in the scratch and feed more barley and oats, give some green feed to keep them busy, provide one nest for five birds, feed a Lay of Bust Mash to guard against a feed deficiency.

Remove all picked birds and treat with anti-pick salve. If necessary beak all birds in the pen. Some poultrymen use a pick-guard, "specs" or a vent shield on each bird in the pen.

RUPTURED EGG YOLKS

Considerable mortality is experienced each fall with newly housed pullets from ruptured ovaries.

On opening the birds, the abdominal cavity is filled with yolk material. The prevalence of this trouble in some flocks has lead to the feeling that it was caused by some transmittable organism. Investigators in the West working on this trouble isolated a cholera-like organism which they thought to be responsible for this condition.

This work has not been confirmed in the East. The general tendency here is to attribute broken egg yolks to injuries caused by flying down from high roosts, sudden fright and rough handling when the birds are housed or during the first few days in the laying pen. Roosting pits, low mash hoppers and dark litter, such as peat moss, will tend to reduce the injury to newly housed pullets. Catching pullets on the range at night and careful handling tend to reduce losses due to mechanical injury.

SYMPTOMS

The birds become listless, lose their appetite, their combs shrink and turn dark and their legs are apt to shrivel. Most of these birds are in very good flesh and have considerable internal fat. Death follows several days after symptoms appear. Post mortem examination reveals the characteristic egg yolk material in the abdominal cavity. Treatment of affected birds is of no avail. Careful handling of ready-to-lay pullets and removing cause of injury in the laying pens will reduce losses of this nature.

BIG LIVER DISEASE (Leukemia)

Leukemia, also called Leucosis, has become an important disease problem affecting birds in the laying house, and is reported from flocks throughout the world. Losses are usually not heavy, yet spread over a considerable period of time. Some authorities feel that this disease has become more prevalent due to the continuous reproduction of laying flocks from pullet breeders.

The disease is believed to be caused by a filterable virus. Some correlation exists apparently between the amount of coccidial infection suffered during the growing period and the cases of big liver trouble experienced later in the laying house.

SYMPTOMS

The disease appears both in the acute and chronic form during the first months after the pullets start to lay.

The affected birds become listless, stay under the dropping boards, lose their appetites and show greenish droppings. The combs usually become purplish and the shanks shrunken and dark.

In the acute form, the birds die suddenly but in the chronic stage may live for weeks, gradually wasting away.

The post mortem findings vary. Enlargement of the liver is most striking as this organ often attains the size of a man's hand. The liver is of a grayish color and may exhibit whitish blotches on the surface. The spleen is enlarged several times its normal size.

A poultryman should always open dead birds if losses occur too frequently; if big liver disease is recognized rigid culling should be carried out until the trouble disappears.

TREATMENT

There is no known flock treatment for this trouble. Stricken birds should be removed as soon as recognized. The rearing of vigorous, healthy, young stock from breeders that have not had this trouble is probably the soundest preventive measure.

INFECTIOUS LARYNGOTRACHEITIS (Infectious Bronchitis)

Infectious Laryngotracheitis commonly called infectious bronchitis is a disease of the respiratory tract, primarily affecting birds in the laying house, but outbreaks among chicks are becoming more numerous.

The disease occurs in two forms, the acute and the sub-acute form, both of which are caused by the same filterable virus and controlled by the same methods outlined below.

Birds suffering with the acute form of infectious laryngotracheitis usually show considerable mortality. The typical symptoms are gasping for breath, watery eyes, sneezing and choking; finally darkening of the comb and wattles indicates death by strangulation.

Birds suffering with the sub-acute form show about the same symptoms only in a much milder form and mortality is seldom experienced.

On post mortem examination of birds affected with the acute form, the windpipe shows foamy blood, yellowish cores or both, mixed with excessive amounts of mucus. It is this material in the windpipe of affected birds that the poultryman uses to prepare a vaccine for the prevention and control of infectious laryngotracheitis.

The disease is highly contagious and great care must be taken not to expose birds to any source of infection.

Carriers (birds that had the disease and recovered) constitute the most serious source of infection. It is very unwise therefore to introduce partly grown or adult birds from outside flocks unless positive assurance can be obtained that the stock has not had the disease.

Returning birds from poultry shows, egg laying contests and allowing poultry crates belonging to poultry dealers to enter the premises constitutes the surest way of running into this trouble sooner or later.

CONTROL

There are several procedures that can be followed in the control of infectious laryngotracheitis.

The most costly plan is to remove from the premises all affected or exposed birds, to clean and disinfect thoroughly the pens and start again with clean young stock. Due to the increasing prevalence of the disease, such a plan does not guarantee against the reappearance of the disease at some future time.

Vaccination of all birds at the first appearance of the disease or as a preventive is probably the soundest procedure; it should not be done, however, unless the disease is positively identified as infectious laryngotracheitis.

If any doubt exists as to the true nature of the disease involved it is more satisfactory to use virus for vaccination directly from affected birds on the premises rather than commercial virus because one may introduce another type of disease than the one present in the flock.

MAKING VACCINE

Home vaccine is prepared by removing the windpipe from badly affected birds or birds recently succumbed to the disease.

The windpipe is slit open lengthwise and all mucus, blood and yellowish material scrapped out and placed in a small bowl. Usually one to two windpipes mixed with 1 tablespoonful of cool, clean water and thoroughly stirred, will be sufficient to vaccinate 100 birds.

The birds should be vaccinated as soon as the vaccine has been made. At night when the birds are on the roost, is a convenient time to vaccinate. The space under the dropping boards is wired off with chicken wire to make a holding pen while the birds are vaccinated. Usually one man catches the birds and a second man passes the birds to the man doing the vaccination, while placing the birds between the knees with the vent exposed. The upper lip of the vent is lifted, whereby a pinkish groove is exposed. This groove is swabbed with a small piece of cotton twisted on a match stick and dipped each time in the vaccine.

When all birds in the pen have been vaccinated the wire is removed and the birds returned to the roosts.

The birds should be examined on the fourth day for the presence of swelling and reddening of the groove, the indications of a "take". At the end of 5 to 7 days the birds should be immune to the disease and little or no ill effeect should be experienced.

A bird in the advanced stage of fowl paralysis. Courtesy, N. Y. State College of Agriculture.

Once a flock has had the disease or has been vaccinated, all new birds and each crop of new pullets should be vaccinated before coming into contact with infected or vaccinated stock.

INFECTIOUS COLD (Coryza)

Mild symptoms of cold are common in birds and often do not indicate a definite disease. It is a good practice, however, to watch the flock for symptoms of oncoming colds and take out the first birds that show sneezing or a wet nose.

The infectious type of cold (coryza) may be caused by at least two different agents, one a germ, the other a filterable virus, but it is almost impossible to tell the difference in the field. Either form is highly infectious and in all probability spread by carriers.

SYMPTOMS

The birds show the familiar signs of a cold, but if accompanied by large amounts of mucus in the windpipe, difficult breathing and gasping may be an outstanding symptom. Loss in production and mortality may be considerable, especially during the winter months. Coryza in baby chicks has recently become an important problem and caused severe mortality.

LESIONS

The lesions vary from slight reddening in the nose to thick mucus in the windpipe. Blood is almost never seen. In coryza of baby chicks, the transparent membranes over the lungs, the air sacs, are cloudy and affected with yellowish patches of pus.

TREATMENT AND CONTROL

To eliminate the first birds coming down with a cold is more valuable than all the drugs in the world. Since this cannot always be done, the best must be made of the situation by giving a laxative, keeping the houses very warm and well ventilated and spraying with mild disinfectants. Home-made vaccines, prepared as for laryngotracheitis, have been tried with some success but can be used only on adult birds. Control measures are designed to avoid contact with carrier birds, crates of poultry dealers and infected feed bags.

The control of baby chick coryza is especially difficult and packing rooms have to be "formalinized" regularly and only new baby pullmans used. Air conditioning in battery rooms tends to spread coryza if present.

PARALYSIS ("Range" Paralysis)

Fowl paralysis, commonly known as "range" paralysis, is a disease of economic importance on practically every poultry farm today.

The disease affects birds in the laying house, yet the largest losses usually are met with in pullets 3 to 6 months of age.

The name "range" paralysis has been given the disease due to its appearance after the birds have left the brooder house, yet pullets raised in confinement may experience as much trouble as birds on range.

The causative agent of the disease is believed to be a filterable virus producing lesions in the nerve tissues.

An idea as to the location of the lesions may be obtained from observing external symptoms such as paralysis of legs, wings or crop and grayish discoloration of eyes. The stomach and gizzard may be paralyzed due to lesions in the vagus nerve.

Paralysis appears in flocks of healthy, rugged looking pullets, but birds that have suffered severe coccidiosis or worm infestation appear more susceptible.

TREATMENT

At present there is no known treatment that will either cure paralyzed birds or prevent its appearance. Raising pullets under ideal conditions, free from coccidiosis and worm infestation and from stock known to be relatively free from paralysis, is advisable.

All breeds of poultry may come down with paralysis, although strains within a breed vary in susceptibility to the disease.

Before purchasing new stock it is advisable to inquire into the amount of paralysis experienced either by the breeder or other poultrymen using the same strain.

Quite often paralysis will appear in pullets 12 to 14 weeks old and a considerable number will be affected, but the flock should not be sold as the trouble usually disappears.

In severe cases the trouble continues on range and in the laying house throughout the winter.

As paralytic birds appear, they should be killed at once and dressed before they lose weight and become worthless. Such birds in good flesh are fit for human consumption.

FOWL POX

Fowl pox is caused by a filterable virus, attacking chickens and turkeys and appears in two forms, the wet and the dry.

This disease is no longer a severe problem as vaccination of young stock not only prevents the appearance of the ordinary fowl pox, but also controls colds and "canker" caused by the fowl pox virus.

The cost of vaccination is so little as compared with the losses which may follow a severe outbreak that few poultrymen, unless well isolated, should take the gamble of not protecting their flocks.

SYMPTOMS

In the dry form of fowl pox, yellow nodules appear on the face, wattles and comb, which soon turn into dark scabs. This form spreads slowly and does not interfere with production or cause mortality like the wet form.

Similar symptoms may appear in the wet form along with watery eyes, yellow patches in the mouth and gullet, and often complete destruction of affected eyes. This form spreads rapidly, may stop production entirely and usually causes considerable mortality and cull birds.

PREVENTION

Prevention is the only successful way to control the disease. The vaccine may be procured from reliable veterinary-medical firms and in some states from the agricultural colleges.

The pullets should be vaccinated between the ages of 8 to 12 weeks. On farms where several ages of chickens are being raised the pullets should be vaccinated as they go out on range. To vaccinate all birds at one time, where there are various ages on the range, often results in vaccination of pullets that are starting to lay, a practice which is seldom wise.

Birds affected with coccidiosis or other intestinal disorders should be allowed to recover before being vaccinated for fowl pox.

Vaccination can be accomplished by either the stab or needle method. The vaccine comes in what is known as 100 dose bottles but with either of the methods a bottle is sufficient for 250 to 400 birds.

STAB method. A small blade of a pen knife is used. A piece of adhesive tap ⅛ inch wide is wound around the blade point, so that ¼ inch of the blade is exposed. The vaccine is mixed according to the directions that come with it. The point of the knife is dipped in the vaccine and then stuck through the skin of the chicken's leg, well up on the thigh, in an area free from feathers.

NEEDLE method. Two sewing machine needles are strapped to a small stick about ⅜ inch apart, so that the needles extend at least ½ inch beyond the stick. The needles are dipped in the vaccine and then stuck completely through the webb of the wing. There are few feathers on the under side of the webb, but if present, they should be plucked or pushed aside before sticking the needle through the skin.

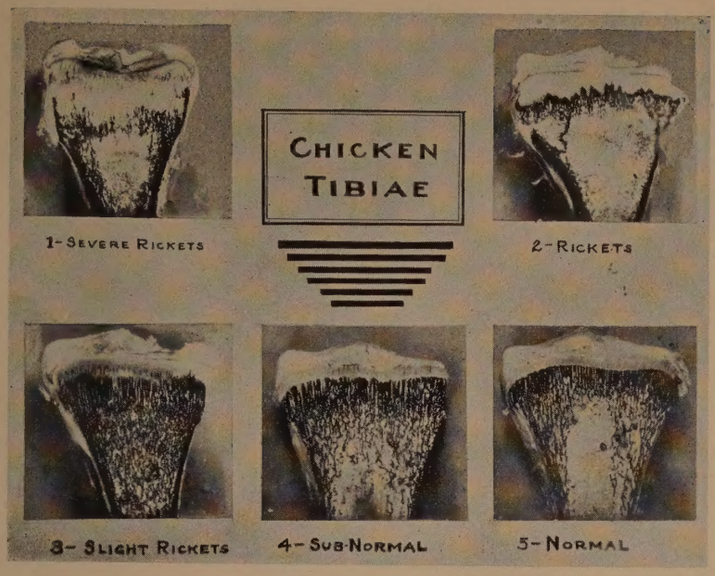
The birds should be examined 7 to 10 days later for scabs, at the place where the needles or knife entered the skin. If scabs appear the vaccination has "taken" and the birds should be immune for the rest of their lives.

GOUT

Gout, sometimes also called protein poisoning, is found in old birds, pullets and even in chicks several weeks old.

The exact cause of the disorder is unknown, but is thought to be due to improper utilization of the proteins in the feed or excessive intakes of protein.

Excessive amounts of baking soda, used in flushing birds may produce



Courtesy, National Oil Products Company.

symptoms of gout and for this reason poultrymen are returning to the use of epsom salts as a laxative or purgative.

SYMPTOMS

Symptoms of protein poisoning appear usually in fast growing chickens and in pullets consuming large amounts of high protein mashes.

On opening the birds the kidneys appear pale, enlarged and covered with a whitish powder-like material; similar material may be found on the liver and heart.

TREATMENT

Reduce the amount of protein-rich mash by diluting the mash with oatmeal until the condition disappears, then gradually work the birds back to normal feeding practices.

RICKETS

Rickets, or rachitis, is due to insufficient mineralization of the bones. Under normal conditions the fixation or deposition of the necessary minerals, especially of calcium and phosphorus, goes on under the influence of vitamin D, a dietary factor that is derived from sunlight or cod liver oil.

If the parent stock received plenty of vitamin D the chicks are resistant to the disease for about three weeks after hatching; otherwise rickets may appear as early as the second week of life. Statistical data indicate that the larger proportion of rachitis cases occurs during the eighth week. Intestinal coccidiosis may often be a contributory factor.

Affected birds show enlargement of the hock joints, wabbly gait, poor growth and poor feathering. Post-mortem examination reveals marked changes in the skeleton; the breast bone may be crooked; the arches of the ribs, which are normally convex, are caved-in at the enlarged cartilaginous junctions, and the bones are thick, soft and rubbery. Under the microscope the changes in the bones are characterized by calcified cartilage and bone substance in the process of resolution.

Treatment and prevention consist in supplying the necessary mineral elements in the feed, especially calcium, and the specific dietary factor. Since it is impossible to rely upon sunlight during the winter months, good grade cod liver oil should be supplied in the mash to the extent of 1 percent for healthy birds and 2 percent for affected ones. Other fish oils can be used, but artificial vitamin D products seem to be less effective for chickens.

* Note—All Park & Pollard Mashes are amply fortified with vitamin D through the use of vitamin tested cod liver oil.

SLIPPED TENDON OR HOCK DISEASE

Slipped tendon, also known as hock disease, appears occasionally in chickens that are grown in confinement. The trouble appears usually in chickens 4 to 6 weeks old. The hock joints become enlarged and deformed, the shanks may be twisted.

The trouble is due to improper mineral assimilation. If large numbers of chicks are affected, excessive amounts of minerals in an unbalanced form usually have been consumed.

Excessive heat and a too rapid rate of growth may be responsible for slipped tendon in young chickens.

Nothing can be done to correct the leg deformities but preventive measures should be instituted at the appearance of several cases in very young chicks. Adding wheat grey shorts and pulverized oats to the ration at the rate of 10 percent will often help.

There are probably some other factors yet to be discovered about this trouble, because chicks raised in batteries may develop slipped tendons while chicks on the same ration in brooder houses may not show any signs of the trouble.

WORMS

Prevention of infestation and not cure should be the program with worms.

ROUNDWORMS

The flock can be treated as a unit for roundworms by using tobacco dust in the dry mash, usually at the rate of 2 pounds to 100 pounds of mash.

Tobacco products put out commercially today for worm treatment are less disagreeable to the birds and as effective as the old straight tobacco dust; the directions on the containers should be followed.

Worm capsules for individual treatment entail more work and, in practice, seldom give results superior to flock treatment in removing both large roundworms or pin worms.

TAPE WORMS

Prevention of tape worm infestation is the best solution to the problem. Although there are capsules on the market that remove and kill large numbers of the worms, it is practically impossible to dislodge all heads of the tape worms, which in time grows out again to full-sized worms.

Infested flocks should be either sold or kept strictly isolated from non-infected birds. All droppings should be removed each day, and placed in a protected place away from flies. It is better to sell the manure than to apply it to land that might be used later for poultry or to place it near a pullet range.

Kamala capsules or tablets have been suggested for tape worm treatment but may be quite severe on birds, especially during production.

POULTRY LICE

Poultry lice may be a serious factor to the well being of a flock.

These parasites can be removed easily by the use of Black Leaf "40" (nicotine sulphate) applied to the roosts just before the birds get up on them for the night.

An undiluted solution of Black Leaf "40" is placed into an oil can and thus applied to the top of each roost for its full length in a small stream. The heat from the bird's body evaporates enough of this material to kill the lice during the night.

Sodium fluoride and blue ointment are effective but due to the amount of work required in handling the birds they are seldom used today.

MITES

Depluming mites can be controlled by the use of Black Leaf "40" as for lice. One part of sulphur to four parts of lard can be rubbed on the affected areas, if individual treatment of birds is desired.

Scaly leg mites can be controlled by soaking the affected legs in warm water and then applying carbolized vaseline.

Red Mites constitute a common and serious trouble especially during hot weather, when these mites reproduce at a tremendous rate. During the day they hide in cracks and crevices around the roosts and nests, and in severe infestations may be found throughout the pens. Red mites work at night, sucking the blood from the bird's body and causing not only loss of blood but also serious irritation and disturbance of sleep.

CONTROL

Control is simple and efficient. Apply any good red mite killer (as Carbolineum) to the roosts and nests once or twice a year.

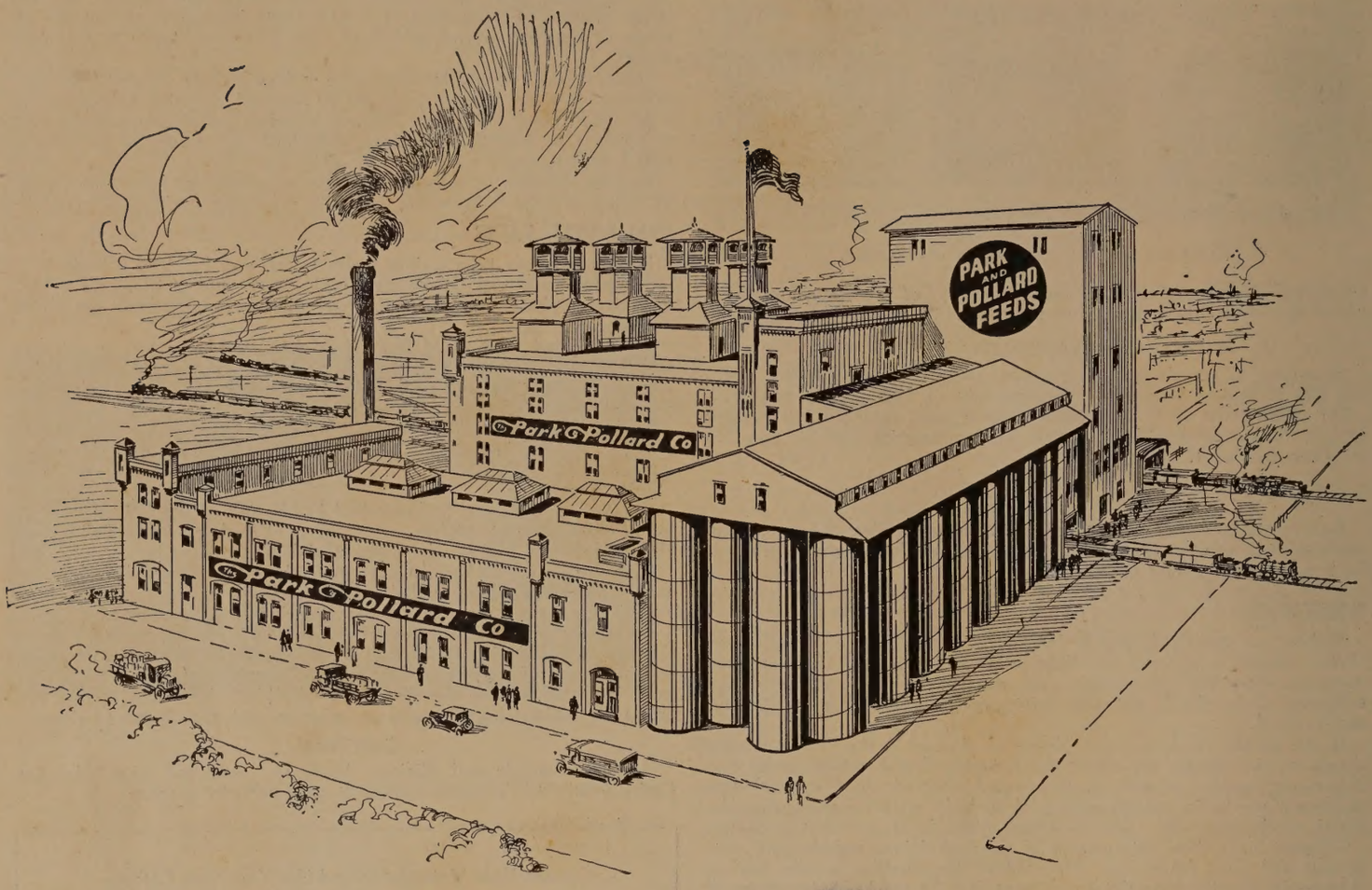
Consult Your Veterinarian and Use Your State College

LIST OF DISEASE LABORATORIES

AT THE STATE COLLEGES OF THE EASTERN STATES

Connecticut	Department of Animal Diseases, Storrs Agricultural Experiment Station, Storrs, Conn.
Delaware	Poultry Pathologist, State Board of Agriculture, Dover, Del.
Maine	Dr. J. F. Witter, Department of Animal Industry Orono, Maine.
Massachusetts	Department of Veterinary Science, Massachusetts Agricultural Experiment Station, Amherst, Mass. Fees: $2.00 for shipment of not more than five chicks or two adult birds.
Maryland	Live Stock Sanitary Service Laboratory, University of Maryland, College Park, Md.
New Hampshire	Poultry Pathology Laboratory, Durham, N. H. (New Hampshire State College)
New Jersey	Poultry Department, New Jersey Agricultural Experiment Station, New Brunswick, N. J.
New York	Poultry Diagnosis, New York State Veterinary College, Ithaca, N. Y.
Pennsylvania	Pennsylvania Bureau of Animal Industry Laboratories, Box 403, Harrisburg, Pa. (parcel post only)
Rhode Island	Agriculture Experiment Station—Kingston, R. I.
South Carolina	Clemson College Livestock Sanitary Department, 408-417 State Office Building, Columbia, S. C.
Vermont	Extension Laboratory, Vermont State College, 85 South Prospect St., Burlington, Vt.
Virginia	Department of Zoology and Animal Pathology, Virginia Polytechnic Institute, Blacksburg, Va.
West Virginia	J. H. Rietz, Oglebay Hall, Morgantown, W. Va.

Your HIRED MAN



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Year after year Park & Pollard continues on the payroll of thousands of successful poultrymen and livestockmen of the eastern states on the basis of:

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2. The ability of its organization to solve these problems efficiently.
3. Superior buying, manufacturing, research and distributing facilities and personnel.
4. Results to the feeder in terms of increased profits.

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